PAPERS ON

INDIVIDUAL TEACHING

APPARATUS

AND

SCHEMES OF WORK

The National Union of Women Teachers
LONDON UNIT,
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PAPERS ON
INDIVIDUAL TEACHING APPARATUS
AND
SCHEMES OF WORK

With Illustrations and Diagrams

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PREFACE.

The National Union of Women Teachers (London Unit) organised two Exhibitions showing Apparatus for Individual work, in the Spring of 1922.

The aim of the exhibitions was threefold :—

A. To be of practical help to teachers.

B. To get more useful apparatus on the market.

C. To publish some kind of memorandum of the exhibits.

A and B having been accomplished, this pamphlet purposes to accomplish C.

All exhibitors were invited to send in a short account of their exhibits : those who have kindly done so, have their articles printed in this booklet.

The Exhibition Committee takes this opportunity of thanking all those who so enthusiastically entered into the spirit of the exhibitions, by giving their ideas and their time, and trusts that this pamphlet will be a useful reminder of the apparatus shown.

C. M. A. COOMBS,

Chairman

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"The secret of the free development of the child consists in organising for him the means necessary for his internal nourishment, means corresponding to a primitive impulse of the child (sucking milk) . . . . . It is in the satisfaction of this primitive impulse, this internal hunger, that the child's personality begins to organise itself and reveal its characteristics. . . . . ."

M. MONTESSORI.

SCHEME FOR INDIVIDUAL WORK IN

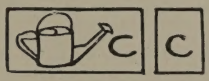
READING

For Children from 4½ to 7 years.

By A. ROBINSON.

1.—Picture Books and Blocks (incidental).

2.—Picture and Letter.—Match separate letter.

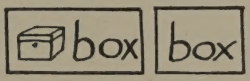


Also match letters to things in room.

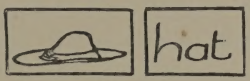
3.—Letters on Card.—Match.

4.—Sandpaper Letters.

5.—Picture and Word.—Match word.

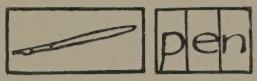


6.—Picture and Word separate.—Match.



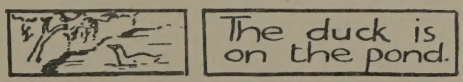
Also match words to things in room.

7.—Pictures and Letters.—Build words to match pictures.

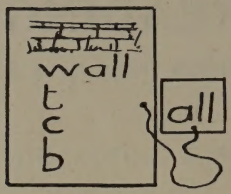


8.—Familiar Nursery Rhymes.—Match words.

9.—Pictures and Sentences.—Match.



10.—Word-building Cards.—Place tablet by each initial letter in turn.



11.—Puzzles.—Missing words, carrying out orders, etc.

12.—Familiar Nursery Rhymes.—Build from memory, phrases or words provided.

13.—Reading Cards.—Words of songs, poems, etc.

14.—Reading Books.—These taken as soon as children ready for them.

The "Sellincourt" Reading Scheme

By V. HUNT.

The reading scheme presented below is based on the two obvious characteristics of all young children, viz., the desire to handle any and every object in their environment, and the impulse to imitate sounds—whether human, animal or mechanical.

Step I.—Letter matching without sounds.

A large cardboard box is divided into about twelve sections, in each of which is pasted a letter.

a	b	c	d
e	f	g	h
i	j	k	l

The child has a number of large cardboard letters of the same size and form as those pasted in the box, and she is required to place each loose letter in its right home. No sound is attached to the letter at this stage, but continual handling makes the child quite familiar with the form.

Step II.—Matching letters with sounds.

(a) Consists of a series of cards about 8 inches by 4, upon each of which is pasted a letter and a pictorial representation of a word of which the letter is the initial sound, thus:—

These are hung round the walls at the children's eye level, so that they can be constantly handled as well as seen.

Two or three cards are hung daily and, as each is placed upon the wall, the word which is illustrated is repeated several times and the initial sound emphasized.

When there are about six or eight cards on the walls, children have cards of similar size and shape, but on each of which is printed the letter only. The exercise here is to hang the loose cards over similar ones round the room.

In this exercise the child should be asked to repeat the sound aloud as she matches the letter. If the sound is not known, the repetition of the word represented on the card leads to a rapid discovery of the initial letter.

(b) **Capitals.** When children are familiar with the small letters the capital is hung beside each letter, so that the connection between the two is established almost from the first stage.

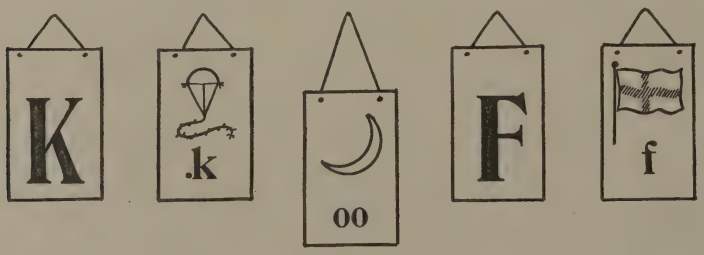
Matching capitals proceeds as in (a).

(c) **Phonograms.** These are introduced after the presentation of capitals. It was found that if left to themselves the children would not choose exercises on word-building: they would analyse words they heard or used by soudning the initial or terminal letter, and there were continued requests for more sounds, so this desire was satisfied by the presentation of phonograms.

Cards similar to those used in Step (a) were prepared thus:—

As these were hung round the room, the word represented was analysed, the phonogram was emphasized and associated with the word by the phrase " 'ar' when you say 'star,' " " 'oo' when you say 'moon,' " " 'ea' when you say 'bead,' " etc.

In order to avoid confusion, phonogram cards were hung at a different level, and the final arrangement on the wall was this:—



Step III.—Word-building.

This exercise is again based on matching. A word and its illustration are pasted on a card about 8 ins. by 6 ins.

At this stage, the letters in use are of the same size as those used in previous steps. The child has four or six cards in a box with the letters necessary for constructing the words: she matches the letters, repeating the sound of each as it is placed on the card, and when all the letters are covered she writes the words on a board or paper.

This exercise easily leads to the process of word-building—as the child sees the picture and says the word describing it; then, in matching the letters beneath the picture, she repeats each sound and gradually realizes that she is building the word she has already said.

After considerable practice with word and picture cards, words are presented without pictures: many dozens of these are necessary in order to give the child a wide experience in building. Later, the children who can build three-letter words easily, are given a wider choice of words such as rush, jump, flag, then brick, clock, spring, splash, and so on.

Letters forming th, sh, ch, ing, are printed together, so that the children know that two inseparable letters have one sound, and they do not attempt to sound individual letters.

Two-letter words such as go, to, we, are also presented as one sound at this stage.

Step IV.—Word-building with phonograms.

The process of this step is exactly as in Step III. Words containing phonograms are pasted on cards and the two letters governing the phonogram are pasted together and known as one sound.

The following exercise also has been found invaluable for word-building with phonograms.

Boxes are prepared, in each of which is a series of words built on one phonogram. On the lid would be printed "oo," and all the words in the box contain "oo." Small cards about 5 ins. by $1\frac{1}{2}$ ins. have printed on them all the letters of a word except the phonogram.

b t	r m	s n

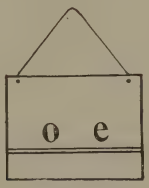
Cards containing single letters or phonograms are in the box, and children build the word, placing the phonogram under the line.

b t

b	oo	t

Step V.—Long vowels.

In teaching the long vowels with the help of a key word such as cake, it was found that the substitution of another consonant for k sometimes presented a difficulty, but a solution was found by making a card which allowed for interchangeable consonants. The vowel and terminal "e" were pasted on a card, and a narrow strip of cardboard attached with paper fasteners just below the letter. This strip gives a little slot into which cardboard letters can be inserted.



The card in illustration is known as the "o—e" card, and the children realize that, however often the consonants vary, the root of the word remains the same.

For the children's practice with long vowels, a series of words based on one vowel sound such as "a—e," are placed in a box with accompanying letters for word-building, and the child proceeds as follows:—

Cape

C	a e

C	a	p	e

Note that the a—e is printed on one card and the "p" card has to be placed between the two vowels.

Step VI.—Exercises in reading.

A picture is pasted on a card and short sentences describing it are printed on two or three other cards. The child has two pictures and six reading cards and she reads a card and places it beside the appropriate picture.

There are many primers and reading books available from the time when the more advanced children commence word-building, but in the large majority of cases it is found that until they can read words without continual building, the children are not attracted to a book for more than an occasional few minutes.

The following exercises are used throughout all steps:—

1.—Sandpaper letters are utilised very largely for the teaching of writing, and they appeal to some children as a means of learning sounds.

2.—The large cardboard letters used in this scheme are very attractive for outlining and colouring, and this exercise familiarises the eye with the form of the letter and prepares the hand for independent use of the pencil.

3.—Loose letters are also useful for word-building without copies. The child will want sometimes to make familiar words, sentences, or nursery rhymes, and a box of loose letters and phonograms provides her with the material for her exercise.

4.—From the commencement of Step III. no exercise is regarded as complete until the words have been written on a board with chalk and then re-written on a paper with pencil, as by this means the word is more likely to be fixed and the child also gets some practice in writing.

LEARNING by DOING

Reading and Writing

By C. A. PUTTERGILL.

SCHEME.

To provide a means for natural mental growth, and to meet the needs of the children's varied abilities and attainments, in learning to read and write, through occupations, and carefully graded steps of difficulty.

Spoken Language is the first essential before starting to talk on paper.

Labelling objects about the room each morning, may be the beginning of learning to read.

A shop containing packets and bottles, etc., seen in mother's cupboard, and then in the shop windows: the children soon recognise names, and say them as wholes, while the contents themselves are useful for sense training, conversation, etc.

All words to be associated with common familiar objects, and printed in the plainest script characters only.

The toys the children play with may now have names attached, the letters to be 2 inches big at least.

All "steps" should be carefully graded, to make the task easy for both teacher and child.

Repetition should be combined with some slight development.

Occupations should be used invariably, as an aid to memory, concentration, and for change, to secure sustained interest. The "**Motto**" should be: "**Keep Busy.**"

Phonetic sounds of initial letter, or letters only, to be given when the child has acquired a vocabulary of written words, and when he is ready for analysis, and be continued until he attacks new words for himself.

Counting may be taught incidentally as the work proceeds, and opportunity arises, as a preparation for symbolic number work later.

A record of each child's progress with the apparatus, should be kept, and be handed on to the next teacher.

Step 1.—Toys and objects for play, sense training, conversation. Name words large size, plain script sanded letters, 2 in. at least.

Occupations.—Bead placing to letters, bead threading and placing. Modelling of letters with plastic material. Later, finger tracing in sand trays, free cutting of letters, etc. Phonetic sounds of **initial letter or letters** only, to be given **incidentally,** e.g.: p-an, ch-air, sp-oon, str-ing, etc. Small letters only to be used at this stage.

Step 2.—Pictures of common objects. Occupations as in Step 1.

Step 3.—Pictures and loose names from Steps 1 and 2. Children to place names to pictures. Occupations as in Steps 1 and 2, also printing on boards with chalks.

Step 4.—Boxes of common objects:—button, wheel, knob, key, velvet, ribbon, lace, etc., six or eight different objects and loose names: these may be unknown words, and will require the child to attack by the sound method before placing the right name to the object. Afterwards print the words and model or draw one or more of the objects.

Step 5.—Colours and names. The shapes to be cut out of coloured paper and mounted on cards, e.g.: triangle, oblong, square, diamond, circle, semi-circle, ring, cross, ellipse. Colours—black, white, green, yellow, red, pink, brown, orange, blue. The shape name to be printed at the back of the card, and used when the colour names have been learnt. Occupations as before, the shapes to be drawn and colour names printed, etc.

Step 6.—Repetition of Step 5, with shape as well as colour name, e.g., yellow square, red triangle, blue oblong, etc.

Step 7.—Repetition of Steps 5 and 6, shapes and colours only. Children draw in colour, then print both colour and shape name from memory.

Step 8.—Picture charts with about four pictures and loose letters, the child to arrange the letters in the right order from memory (spelling) only name words from previous steps to be used at this stage.

Note.—Symbolic Number Work may begin here.

Step 9.—Capital letters and connecting words. The first line of the nursery rhymes printed on cards, about four in a packet (Little Bo-Peep has lost her sheep, etc.). Loose pictures of the rhymes have to be placed on the space marked on the cards. Occupations.—Child to place picture, write, read, model, etc.

Step 10.—A complete nursery rhyme; child to write, read, etc. More attention to connecting words at this stage.

Step 11.—Charts with picture and single sentence story:—The cow is standing in the nice cool water. Occupations as before, but writing with coloured chalk on brown paper.

Step 12.—Two-sentence stories, and occupations as in step 11.

Step 13.—Poems and simple rhymes, etc.:—

Up the airy mountain,
Down the rushy glen, etc.,

which the child may memorise, etc. Stories for free expression drawing may be used here:— Seven dwarfs took their picks, and went up the mountain to dig for gold, etc., etc.

Step 14.—The same as step 13, but longer matter. Also simple quotations which the child may memorise and use for recitation, e.g.:—Ruskin says, "A little thought and a little kindness are often worth more than a great deal of money," etc.

Step 15.—Pictures, or picture post-cards, with longer stories, about four in a packet. The child to place story to picture, read, write, etc.

Step 16.—A one-page picture and story book:—Teddy Tail, Pip and Squeak, Chicks' Own, Simple Stories of Japan, etc., etc.

Step 17.—"Mr. and Mrs." books, by Lawson Wood: pub. by F. Warne and Co., 2d. each.

Step 18.—Large print story books arranged in order of difficulty and length. These should be numbered to ensure the child's having the right book, which fits his individual attainment. 100 or more of these small story books will be required.

Note.—The work should fit the child. He writes what he reads, and reads what he writes.

WRITING.

Step 1.—Bead placing.

Step 2.—Bead threading and placing.

Step 3.—Making words with plastic material.

Step 4.—Sand tray tracing with finger.

Step 5.—Chalk and boards.

Step 6.—Free cutting with scissors and brown paper.

Step 7.—Coloured chalk and brown paper **(no lines).**

Step 8.—Thick blue pencils and white paper (No thin pencils to be used).

Step 9.—Black leads, but not until the child has full control over the smooth, easy-running instrument like chalk, etc.: even then, the pencil should be thick, to avoid faulty habits of holding.

Step 10.—Pens and ink. The holders should be no less than $\frac{3}{8}$ in. thick, and the pen nibs should be of the smooth easy-running kind. This step could with advantage be deferred until a good start has been made in the Senior School.

READING SCHEME

(with Apparatus).

By M. L. DARVELL.

The scheme outlined below has been graded to meet the requirements of the "slow child." The average child will not require to go through every step, but will "skip" one here and there with ease.

The apparatus throughout has been designed to illustrate **principles.** The difficulties which children meet have been placed under general rules, so that the working of the various steps puts them into the possession of a great deal more material than actually appears in the apparatus.

The new knowledge gained at each step becomes the basis for the step that follows.

The material for the apparatus is very inexpensive, consisting of cardboard, fine string, sheets of gummed letters (which are on the London County Council's Requisition List) and a box of paints or coloured pencils.

The scheme is divided into three stages, and each stage follows the same method of development, e.g. :—

Stage 1.—Sounds (single) — Phonetic building of the simplest form — Reading.

Stage 2.—Sounds (double). Phonetic building on a more advanced scale—Reading.

Stage 3.—Sounds (phonograms)—Phonetic building and irregularities—Reading.

Stage 1.

This stage contains nine steps and may begin with the "three-year-old" babies. They have given to them a set of cards containing pictures of common objects illustrating the sounds of the alphabet. The children play with the cards and become familiar with the objects. When they can say the name of each object readily, they are to pass on to Step 2.

Steps 2, 3, and 4, are concerned with the learning of letters The children are given cards on which pictures of the objects with which they have become familiar are stuck. These cards are threaded from side to side with fine string. A box of loose letters (capital and small) is also supplied. These letters are mounted in twos (one capital with one small) on strips of cardboard. Part of the strip is bent backward so that the letters stand up like photograph frames. In addition, the end of the "stand" is bent upward. In working the apparatus, the child places the letters beside the approximate pictures, slipping the up-turned end of the "stand" beneath the string on the cards. This holds the letters firmly on the cards, which can then be carried about, and put away at any stage the child has reached, without disarrangement of its work. This method is adopted throughout the scheme and when the apparatus is set up it has the appearance of a miniature camp with rows and rows of little white tents.

Steps 2 and 3 are concerned with letters **and** pictures. Step 4 discards the pictures and deals with letters only.

At this stage the child knows its sounds, and Steps 5, 6, and 7 concern themselves with the building of two- and three-letter words. The children are supplied with cards containing, first—fixed vowels to which they add loose consonants; second—fixed consonants to which they add loose vowels; and, third—fixed two-letter words to which they prefix loose consonants. By means of a simple colour scheme, the children make a bona-fide word each time, and no time is wasted in building combinations of sounds which have no meaning.

Step 8 is one in which, by means of fixed pictures and loose words, simple phrases are built up illustrating the use of words to express ideas. Following this exercise, is the first reading book. It contains a picture on each page and one or two sentences bearing directly on the picture, printed in large script below.

Stage 2.

This follows the same method as in Stage 1. By means of fixed pictures (of a drum, a bunch of grapes, a broom, etc.) and loose double-sounds—dr, gr, br, etc.—a whole set of new sounds is learned.

In Step 11, these new sounds (loose) are prefixed to two-letter words (fixed on a card). In Step 12, building in **two** directions is performed. Loose **final** letters are added to the two-letter words (fixed) and loose **initial** letters are prefixed, and so the words expand in two ways. In Step 13 the same thing is repeated, but the fixed roots are no longer **words,** but sound-combinations, such as "es" and "um."

Step 14 deals with double consonant sounds such as "ss," "ff," etc., and Step 15 with the "ng" sounds. In Step 16, the child is introduced to his second reading book, which is built up in the same way as Book 1, but on a more advanced scale. It contains pictures and reading matter connected with them. The whole of the book is purely phonetic, with the exception of about twenty small irregular words which have been introduced at intervals through this stage.

Stage 3.

This deals mainly with the chief "irregularities."

Its first step (Step 17) takes the commonest phonograms. These are loose in boxes. The child is given cards on which skeleton words are fixed. These words do not "live" until the appropriate phonograms are placed in the spaces left for them, e.g., c — l (skeleton word fixed on the card), c u r l (phonogram in position). An indication at the base of the card guides the child in choosing the correct phonogram for each word.

Steps 18, 19, and 20 deal with the different "silent letters," e.g. :—

1.—The silent letter which makes no change at all in the word, such as the "t" in "catch."

2.—The final silent "e," which alters the sound of the vowel occurring previously in the word, as in "made."

3.—Letters (other than "e") whose silence alters the sound of an accompanying vowel, e.g., the silent "i" in "field."

In these steps the silent letters are loose, and each has a tiny slip of paper attached to it called a "blind."

The silent letters are placed in their correct places in skeleton words on cards, and then in each case the "blind" is pressed down over the letter, hiding it from sight while the word is being pronounced. After pronunciation, the "blind" is raised again, so that it is correctly visualized for spelling.

The last Step — 21 — concerns itself with words containing vowels which take on a new sound, such as "a" in "path," and also with the "y" at the end of such words as "funny," "jolly," etc.

After this step, the child who has handled the apparatus throughout, mastering each step, should attack any ordinary Infant Reader without much difficulty.

Graded Apparatus Used in Teaching Reading

By E. N. BAILEY.

NOTE.—This apparatus is entirely home made, much use being made of illustrated catalogues, post cards, etc., and is useful for first experiments in individual work.

Reference Sheet or Dado.—Pinned on wall of classroom, where children can easily refer to it: showing a large-sized letter and its appropriate picture for every letter of alphabet.

Lists of "pet" words for each letter—p- pot, b- bag, t- tub, d- dog, c- cat, k- king, g- gun, a- apple, m- mat, n- net, l- ladder, r- rat, h- hen, i- ink, y- yellow, w- wall, f- fish, v- vest, s- sun, z- buzz, e- egg, u- up, j- jump, x- box, q- qu- quack.

Stage I.—Letters.

Step 1.—Sanded letter.

Step 2.—Sheet of pictures, all beginning with same letter—this letter thickly painted in corner. Children touch letter and picture, e.g., b- bag, b- bell, b- box, b- boy, b- bed, b- boat, etc.

Step 3.—Sheet of pictures—initial letter printed beside each picture—and a box of loose letters. Children place a loose letter over corresponding printed letter.

Step 4.—Sheet of pictures, box of letters. Children match letters to picture.

Stage II.—Words (regular).

Step 1.—Sheet of pictures—words printed underneath, and a box of letters. Children form words with letters, placing them over printed letters.

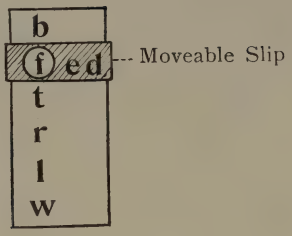
Step 2.—Box of objects and loose words. Children place words by objects.

Step 3.—Sheet of pictures—box of words. Children match words to words printed under pictures.

Step 4.—Sheet of pictures (no words printed)—box of words. Children match words to picture.

Step 5.—A large composite picture and box of words. Children match words to parts of picture.

Step 6.—Word-building slip.



Children read each word as each letter appears in cut-out portion of slip.

Step 7.—Box of loose letters. Children use these for free word making.

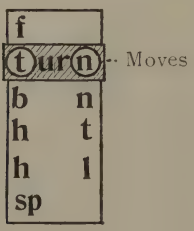
Step 8.—Sheet of four pictures—four cards with short descriptive sentence on each card. Children place cards under picture described.

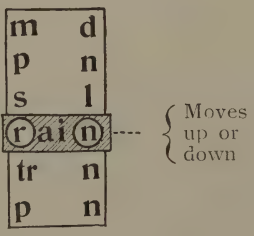
Stage III.—Double Sounds.

Step 1.—Reference chart with chief phonograms and corresponding picture.

Step 2.—A sheet of pictures of words containing one double sound, e.g., "ar." Box of letters containing this phonogram "ar," as well as single letters. Children build up words, e.g., c-ar-t, t-ar-t, ar-m, f-ar-m. b-ar-n, etc.

Step 3.—Word-building slips, used as before.





Step 4.—Boxes containing cards with (a) initial letters or prefixes printed in red, and (b) remainder of word in black. Children form words by placing one of each of (a) and (b) together :—

r	ing
s	ing
br	ing
mend	ing
walk	ing
end	ing

Step 5.—Sheet of pictures containing various phonograms learnt. Children build up words.

Step 6.—Sheet of four pictures and four cards with long descriptive sentences. Children place sentence under corresponding picture.

Stage IV.—Puzzles.

Example 1.—Apparatus provided: Box containing black discs (dots), red dots, green dots, red rings, and a sheet with long, short, curved lines and a circle, with instructions. Put the red dots on the long line. Put the green dots on the short line. Put the black dots in the circle. Put the red rings on the curve.

Example 2.—A set of cut-out "washing." A clothes line drawn —with numbers at intervals along it. Hang up the "washing." On 1 hang a pair of red socks. On 2 hang the big towel. On 3 hang up the brown jumper, etc.

Example 3.—Dressing dolls. The dolls are cut out from post cards—and their clothes. Each doll is named and has to be dressed according to instructions, e.g., Jack is to have a sailor's cap, a blue suit, and his boat, etc.

READING

SCHEME OF WORK FOR TEACHING READING,

from beginning until Child is fluent.

By D. J. GOODALE.

1.—**Letter-matching.** Picture, with symbol of initial sound shown. Child matches symbol.

2.—**Connecting symbol of initial sound with object.** Picture without symbol of initial sound. Child places symbol by picture.

3.—**Word-matching.** Picture, with name. Child matches name.

4.—**Connecting printed word with object.** Picture without name. Child places name by picture.

5.—**Beginning of word-building.** Picture, with word-ending (e.g., "et") shown. Child adds missing initial sound.

6.—**Building whole word.** Picture, without name. Child builds name.

7.—**Double consonants.** Pictures of objects, of which names begin with double consonants. Name shown, minus initial double consonant. Double consonant added by child.

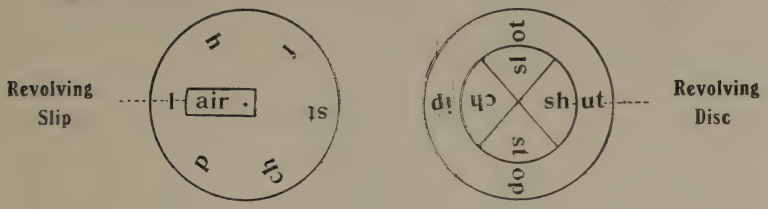
8.—**Sentence-matching.** Picture, with descriptive sentence. Child matches sentence word by word.

9.—**Building words in sentence.** Sentence, with pictures in place of nouns. Child copies sentence, building words represented by pictures.

10.—**Supplying missing words in sentence.** Nursery rhyme (familiar to child, so that required word is obvious), with blanks. Child places words in blanks.

11.—**Sentence-building.** Picture. Child builds nursery rhyme below.

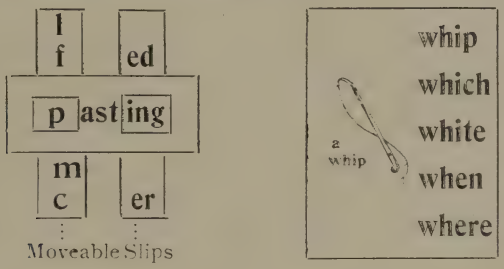
12.—**Apparatus to teach words of special difficulty** (see diagrams).



13.—**Individual reading cards.** Pictures, with simple prose.

14.—**Individual reading and learning by heart.** Pictures, with simple poetry.

15.—**Aids to dictation** (see diagrams).



16.—**Aids to composition.** Pictures, with questions to be answered.

Individual Reading Scheme

By M. S. ASHTON.

The Reading apparatus is based upon the primers used in school, and ensures the child's being able to read fluently when he has mastered all the steps.

I.—The letters of the alphabet are painted, and then sanded on post cards. To add interest, suitable pictures are painted on the card also, e.g., "h" has a house.

II.—Phonetic three-letter words are painted under the picture corresponding to each word, loose words and loose letters are provided for the children to match them.

III.—Sentences. (1) Strips on which are painted two-letter words, e.g., be, we, he, she, me, and loose letters to match. (2) II. and III. (1) are combined to match with sentences, painted on cards.

IV.—The next stages are devoted to the irregularities, e.g., (1) double consonants, (2) double vowels, (3) long vowels and more irregular words, and consist of about 20 different steps.

The words to be taught are printed in ink on cards, the sounds to be taught, in a different colour. The lettering is smaller than in the preceding stages. The child prints the words on a small board as he learns them. Finally, the child is introduced to the primer.

The kind of apparatus is varied for each primer, as well as the colour of the cardboard—to help the child to realise that he is making progress.

The following are a few examples:—

(1) Part of the word which does not vary is printed on the card, a sliding slip is inserted for those parts which do vary, or

(2) The root is printed and separate letters are provided to be placed in position, or

(3) A circular disc has the varying letters printed round and a movable finger attached to the middle, upon which is printed the root.

(4) Pictures of objects corresponding to words to be taught. The names are printed beside the object, and other words having the same sound are printed underneath to give practice. On the opposite side is a short story containing the words.

Round the room are pinned strips of canvas divided into pockets. There is a pocket for each step. The pockets are labelled, so that the children can themselves replace the step when known and obtain the next one.

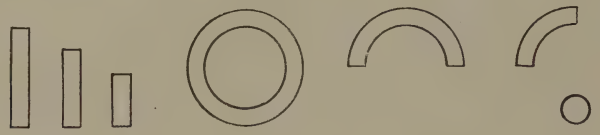
Letter and Word Building

By ANNIE BUMPSTEAD.

In teaching the alphabet to little children, much emphasis is now laid on learning the sounds, and though this is very necessary, it is also necessary that they should realise the forms of the letters.

Many children do not know the names of the letters which make up the little words they learn, and many will say that "d" is dog (not *stands* for dog—though why "dog" only?) or "p" is pig, because they have almost lost sight of the letter in the picture and the sound. Certainly a picture with each letter is most useful, and **many** might be used for each letter in teaching the sound, but with all this, those letters which are rather similar in shape, as d, b, p, g, etc., are often confounded, thus preventing the easy recognition of the word in which they occur.

It is therefore a great help to the child, and makes his knowledge much more **definite**, if he is allowed **to build up** each letter with simple white strips and circles, half-circles and curves, from large model letters.



These cards of letter-forms are all that are needed for all the letters and words of our language. They are easily cut from thin cardboard, or thick paper, should be of a uniform size, e.g., such as will fit into a matchbox; and the white card **shows up boldly** on the child's desk or millboard. **A penny** makes a useful model for the circle and curves, and is even quicker drawn round, or cut round, than by using compasses. Those children who are allowed to use scissors, delight in cutting the forms.

In connection with this letter and word-building, I find it very interesting to the little ones to place a picture of the word to be built up, on the table before them.

The large coloured cut-out letters now beginning to be used are very good, but still they are ready-made, and the similarity of some still remains, while we know that what a child **makes** is both a pleasure to him and is sure to make a much deeper impression on his mind.

The "Sellincourt" Number Scheme

By E. M. VOYCE.

In drawing up this scheme of number, the following ends have been kept in view:—

1.—To show children what number is.

2.—To give children mental pictures of number as a means of reference.

3.—To give some training in clear thinking.

I.—What number is.

Number is **juxtaposition in space.** Three is three because one and two have preceded it, hence the process of counting is fundamental.

II.—Number Pictures.

The child thinks that number words are the names of particular things, whereas each number word stands for the whole group of objects already counted; so number is introduced by means of number pictures. The grouping chosen is the universally known one used on playing cards.

Step I.—Number Pictures.

Consists of a series of cards 5 ins. by 3 ins., cut from brown mounting cardboard, with discs of coloured paper stuck on to form number pictures; and a box of counters.

The child covers each disc with a counter. The teacher asks "How many?" If the child does not know—the teacher shows the child how to touch each counter, saying "one, two, three," etc.

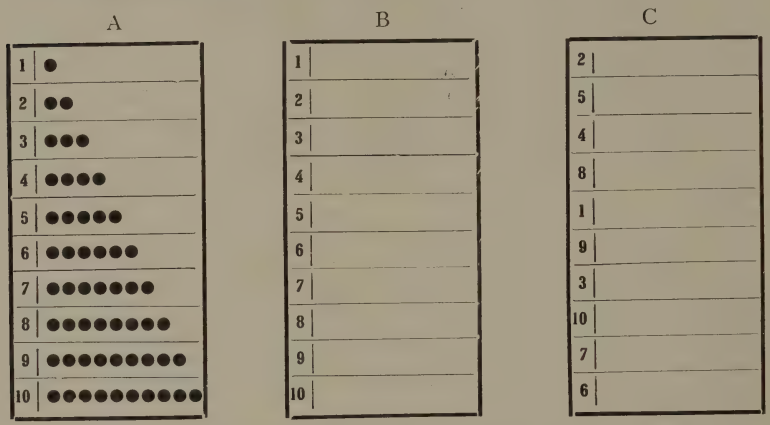
Similar number pictures are hung on a wall of the classroom as a key to the order of the cards.

Step II.

Consists of blank cards with number affixed. The child places the counters as in the number pictures.

Step III.—Counting to shew number as **juxtaposition in space.**

Consists of brown cardboard 15 ins. by 11 ins.

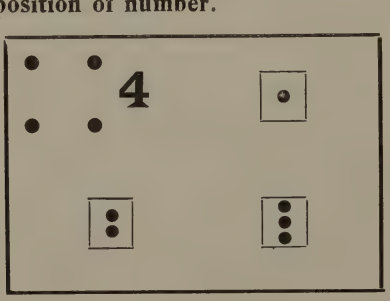


"A" has discs of coloured paper stuck on the card from 1 to 10. The child covers each paper disc with a counter.

"B" has only figures. The child has to place the right number of counters beside each figure.

"C" has the figures in any order. This tests the child's knowledge of the value of the figures.

Step IV.—Composition of number.



Cards are prepared for each number from 4 to 10. Each card has the number picture, the figure, and one part of the various components of the number.

Cardboard dominoes are used. Half of each domino that makes four is stuck on the card, the other half is put into a match-box marked "4." The child has to complete each dominoe to count "4," e.g. :—

Under [•] child places [⁚] to show [•/⁚] $1+3=4$.

The child records the result on his board :—

$1+3=4$ $2+2=4$ $3+1=4$

Step V.—Preparation for Multiplication.

Boxes of beads are prepared with the figures 2, 3, 4, 5, etc., on the outside. The child takes the "2" box and threads beads in twos—2 blue, 2 red, etc.

This step is used side by side with all the steps, the younger children just threading and counting the beads, the older ones making a record on their boards :—

$1\times2=2$ $2\times2=4$ $3\times2=6$

and going on to any number, e.g. :—

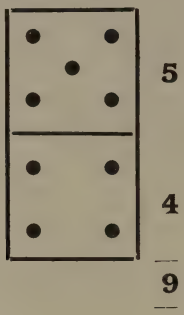
$14\times2=28.$

This exercise shows the children what multiplication is, viz., the same number added together several times.

Step VI.—Exercises in Addition, by means of dominoes.

(A) Used horizontally :—

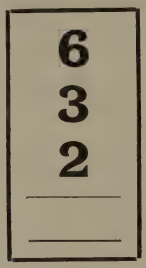
(B) Vertically, to form a sum:—



The child has a box of dominoes and so works many sums.

(C) Playing cards are also used (Patience size). Two or three cards are stuck one underneath each other on a piece of cardboard and the child writes the equivalent figure by the side to form a sum.

(D) Figures only are stuck on cards to form addition sums:—



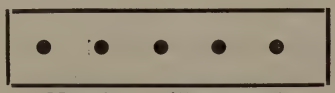
The child transcribes the figures to his board and works the sum.

Step VII.

Consists of several cards as above, with the figure and the number picture, in order to help the child to say four as a whole and then add on five, six, seven, eight, nine. The child writes:—

4 + 5 = 9.

Step VIIIa.—Subtraction.

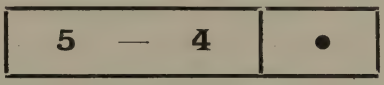


Number 5 illustrated.

Prepare a strip of cardboard as long as necessary and about 2 ins. wide. On this stick 5 discs of coloured paper. Cut 6 strips of cardboard the same width and write on them:—

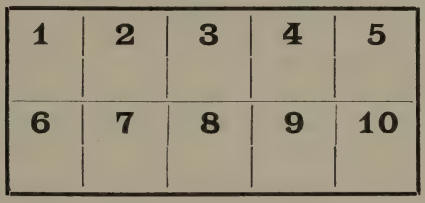
5 — 5, 5 — 4, 5 — 3, 5 — 2, 5 — 1, 5 — 0,

and cut the length, for instance in 5—4, so that when placed on the disc strip, 4 discs are covered, leaving one disc shewing.



The child writes: 5 — 4 = 1.

Step VIIIb.—Subtraction.



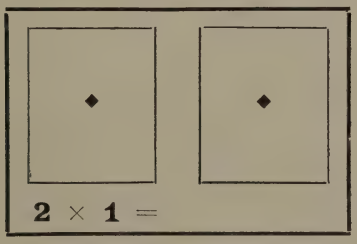
Consists of a piece of brown cardboard divided into 10 squares numbered; a box of counters and a series of strips reading 8 — 6, 9 — 5, 5 — 4, and so on.

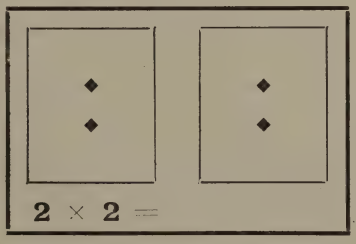
The child reads 8 take away 6, puts out 8 counters on the spaces 1 to 8, then takes away 1 to 6 and finds two counters left, and records on the board:—

8 — 6 = 2.

Step IX.—Tables.

The children are familiar with the idea of multiplication given to them in bead threading. The ordinary form of tables is taught by means of playing cards in following manner:—





The child is asked "How many two's?" then "How many spots?" and then writes: 2 × 2 = 4, and so on.

For three times table, three cards are stuck on brown cardboard, and so on.

In the writer's school, table cards are only prepared up to five times, it having been found that the children can build up for themselves the more difficult tables.

Step Xa.—Introduction to tens.

Prepare a box with one bundle of ten sticks and ten loose ones, and a series of cards with

$$\boxed{10 + 1} = \qquad \boxed{10 + 2} = \qquad , \text{ to } \boxed{10 + 10}$$

The child places the bundle of ten and one loose stick under the strip $10 + 1 =$, counts and then writes $10 + 1 = 11$, etc. When $10 + 10$ is reached, the ten loose sticks are put into an elastic ring, so introducing our grouping into tens.

Xb.—Exercises in tens.

Consists of a box of beads in tens, i.e., ten beads on a string, and cards with 10, 20, 30, etc., printed on them. The child takes out card and places two bead tens beside it, and so on.

This is carried a step further with cards having on them

$$\begin{array}{rcr} 20 & \text{and} & 30 \\ +\ 30 & & -\ 20 \\ \hline & & \\ \hline \end{array}$$

which the child works by means of the beads.

Xc.—

Consists of a box with sticks in bundles of ten and loose sticks, and cards with any number on—16, 24, 37, etc.

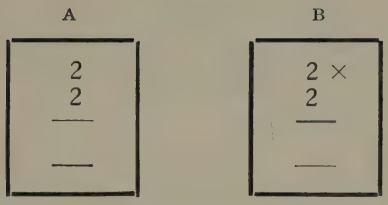
The child takes [16] and places beside it one ten and six loose sticks. This exercise leads on to sums such as

$$\begin{array}{r} 16 \\ 24 \\ 37 \\ \hline \\ \hline \end{array}$$

when the child, having placed the requisite sticks beside each number, groups the loose sticks into tens and finds he has seven tens and seven units.

Step XI.—Multiplication.

Series of cards are prepared to show that multiplication is a form of addition.



On one side of a card two and two is shewn as an addition sum (A). On the reverse side twice times two is shewn as a multiplication sum (B). The child writes down both sums and works them.

Step XII.—Introduction to Division.

1.—Sharing.

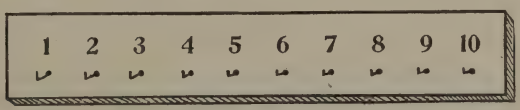
Prepare boxes divided into 2, 3, 4, 5, and 6 compartments, with some counters and a series of cards shewing statements such as $4 \div 2$, $8 \div 2$, etc., for the two-compartment box; $12 \div 3$, $15 \div 3$ for the three-compartment box, and so on.

The child reads 4 sweets shared between 2 children, then counts 4 counters and one-by-one puts them into the two compartments, writing on his board:—

$$4 \div 2 = 2.$$

2.—Dividing into 2's, 3's, 4's, etc.

Prepare a strip of wood 16 ins. long. Screw in cup hooks about $1\frac{1}{2}$ ins. apart, and stick figures 1-10 over the hooks.



Have a number of brass rings and series of cards asking questions such as "How many two's are there in eight?" "How many threes are there in 21?"

In the first example, the child counts out 8 rings and then hangs them on the hooks two at a time, to find that 4 hooks each have 2 rings. He writes:—

$$8 \div 2 = 4.$$

In the top class of the Infants, quick methods of working may be shewn, e.g.:—

1.— $9+6 = (9+1)+5 = 15$.

2.—With three consecutive numbers, the answer is always three times the middle number: $6+7+8=21$.

3.— 16—9 = 10—9+6 = 7.

Typical problem sums should be worked on B.B. to shew children how to attack them, and then cards of sums are worked.

N.B.—The numbers from 1 to 100 are cut out in coloured paper from a good model and stuck round the walls of the room. Any child who does not know how to write any particular number uses the wall as a reference.

The cardboard used is brown mounting cardboard, which is very firm and does not show finger marks.

All figures are printed figures—not written ones—in order that the children should have a good form to copy.

NUMBER

By G. E. PUTTERGILL.

NOTE.—Symbolic Number should not be attempted until the child has a knowledge of mathematical values in size, volume, etc., and can count accurately and understand values up to 10 at least; even then, reading to Step 8 in the reading scheme should have been mastered.

Step 1.—Single picture or object chart with figure and number name associated (0 1—one). Occupations as in the reading scheme.

Step 2.—A packet of counters, with loose figures and number words, the child to arrange the counters in rows, then place the right figure and number word at the end of the rows. Copy on boards, draw, etc., e.g. :—

0 1 one.
00 2 two.
000 3 three, etc.

Step 3.—Repetition of figure making and word printing, using boxes and spots marked on the bottom. Two boxes arranged addition fashion on stout cards. Figures and words have to be made from memory, after the spots have been covered with counters. Then copy on boards and proceed with another. Analysis of number may be taught (incidentally) here.

Step 4.—Repetition of Step 3, except that figures are printed on the bottoms of the boxes. The child should now associate symbol with value successfully.

Step 5.—A packet of counters, with loose figure and word tickets. The child arranges in rows, then places tickets at the end of the rows and, using two match sticks for a fence, he places the total ticket between, thus :—

0000 4 four.
000 3 three.
00000 5 five.

Step 6.—A packet of word sums, the child transposes into figures:—

three
four
———
———

and completes the total.

Step 7.—A packet of figure sums which the child transposes into words. Symbols and values, figures and words, should now have a real meaning, and be known up to 10 before taking the next step.

Step 8.—Dominoes for children to make their own sums to 10 and above.

Step 9.—Easy problems, e.g., reading with understanding. Picture cards, "How many buttons on two coats?" etc., etc. Also one double domino card for de-composition of number, to be counted out to the right, and totals compared.

Step 10.—Arithmetical signs. The child has the chart and a box of money, arranging his own amounts, using the plus sign only at first. Afterwards the minus sign, multiply and divide.

Step 11.—Money calculations. A packet with pictures of common priced objects on the outside, in pence values only at first. Cards of questions to be put inside the packet.

Step 12.—The same as Step 11, but the articles priced in shillings and pence. The questions more difficult.

Step 13.—Weighing with balance, finding the values of the silver coins by weight, also halves, quarters, etc., ounce weight, etc.

Step 14.—Shopping: the toys used in reading. The children to write name and price tickets, then buy and sell, first with copper coins, then with silver and copper. Weighing and measuring, etc.

Step 15.—Boxes of practical arithmetic, including weighing and measuring, drawing, etc., etc. Three sets graded, A, B, C.

Step 16.—Nisbet's or other standard arithmetic book used in the Senior School. Only the brighter children would be expected to reach this stage in an Infants' Department, but those children who have completed the Infants' scheme should certainly proceed.

Apparatus for Teaching Arithmetic in the Infant School

Based upon the Abacus

By L. VELLENOWETH.

Principles.

Directness of appeal. Simplicity in manipulation.

Material required.

Beads of uniform size and colour used throughout the apparatus. Enamelled wooden beads $\frac{1}{4}$ inch diameter good but difficult to obtain. Small wooden beads $\frac{3}{8}$ inch (dyed) from Beads' Company, Aldersgate Street, in use.

Bead Frames (to stand on any of the four sides) can be made from old wooden chalk boxes with the bottom taken out—one box will make three frames. Millinery wire used, upon which beads of **one** colour are threaded.

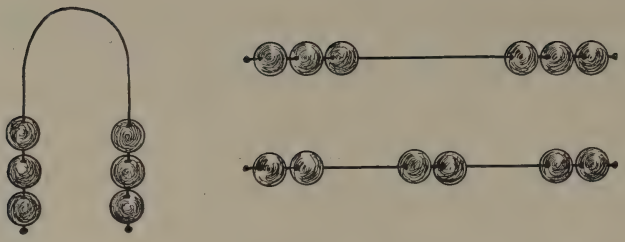
Apparatus.

1.—Beads for each number group from 1—10 (or 12) threaded upon string in stable or unstable form. Length of string in unstable groups should be at least double the quantity covered by the beads.

2.—Bead Frames with 2, 3, 4, 5, and 6 lines, each line containing 10 (or 12) beads.

Use.

1a.—Unstable number groups used for teaching and providing exercises on decomposition and the four rules. The stable form of any number should be known before the unstable form is introduced.



A "reference" string of 10 (or 12) unstable in form kept in the box of each child who is ready for it

1b.—Stable number groups for teaching tables. These number groups kept in a box subdivided into compartments which are suitably labelled.

In building up, e.g., three times table, child takes out three 1's, three 2's, three 3's, etc., from the box. In first stage appropriate figure placed beside each collection, in second stage the table is written step by step.

2.—Bead frames used for—

(a) Exercises on the four rules worked on the frame.

(b) Exercises worked on paper and corrected by reference to the frame.

(c) Tables with the help of notched pieces of cardboard, e.g., a two-notched piece for the 20-bead frame, a three-notched piece for the 30-bead frame, and so on.

Process.—To send up or across the frame, in one movement, the same number of beads, e.g., on two lines for twice times table, on three for three times table.

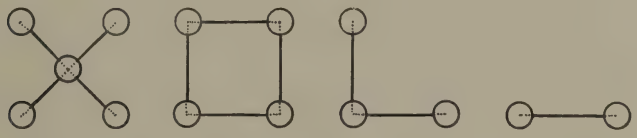
"Joy-in-Work" Series

Arithmetic for Infants

By E. WILLIAMS.

The underlying idea of this apparatus for number teaching is the extension of the principle of definite arrangement. Children are given (or they draw) the shapes—

and they experiment to see how many objects can be placed on each shape. They find the cross accommodates five, the square four, the corner three, and the line two.



Each different shape becomes identified in the child's mind with the number it holds, and is soon logically taken to stand for that number. This prevents counting in ones, and the shapes become a quickly-drawn and easily-remembered link between the concrete and the abstract.

As the shapes combine easily to form tens, the answer to a demonstrated table can be read off at a glance.

(The method is explained in detail in "One Method of teaching Arithmetic in Infants' Schools," price 1/6, published by Williams and Phillips, Rednal, Birmingham, and now obtainable through any contractor. The method can be very successfully worked on given lines, without any special apparatus.)

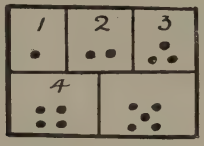
SCHEME FOR INDIVIDUAL WORK IN

NUMBER

For Children from 4½ to 7 years.

By A. ROBINSON.

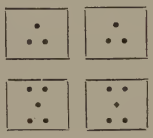
1.—Cards with Groups of Discs and Figures painted, on which to place counters and figures.



2.—Cards with Discs only.—Place figures.

3.—Cards with Figures.—Place counters.
Repeat these exercises with numbers mixed.

4.—Matching Groups, for practice in visualisation.



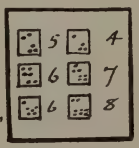
5.—Number Pictures, copied and orignial.

6.—Writing Figures from copy.

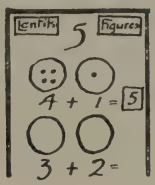
1 2 3 4 5

Stages 1—6 with numbers to 10.

7.—Groups in two different colours. Place figure for sum of two.



8.—**Composition of Numbers to 10.** Number of lentils indicated by figures laid in discs. Answer placed in square.



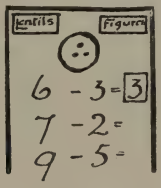
These sum afterwards written down.

9.—**Simple Addition Sums** worked in same way.

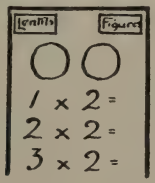
10.—**Dominoes.**—Write sums and answer.

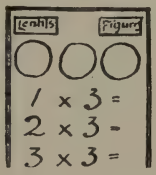
3 + 6 = 9

11.—**Subtraction.**—Work sum from large disc with lentils, and place answer from figures provided.

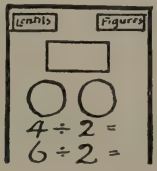


12.—**Multiplication.**—Work in discs with lentils and write in books.





13.—**Division.**—Place lentils to be divided in square. Divide into discs. Write in books.

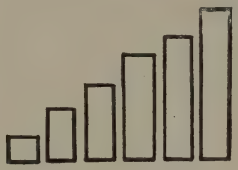


14.—Sum Cards.—All of one kind and mixed. Work without apparatus as soon as possible.

15.—Introduction of Tens and Units.—

1.—Sticks (bundles of ten and units).
2.—Hundred chain.
3.—Long Stair.
Montessori Apparatus.

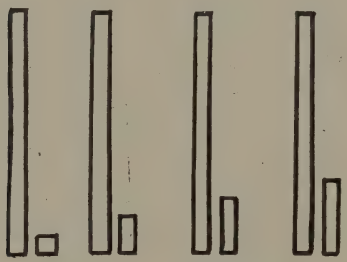
16.—Sums also worked with **undivided unit.**



1 2 3 4 5 6

6 5 4 3 2 1

These used for composition and sums.



$10+1=11$ $10+2=12$ $10+3=13$ $10+4=14$.

These used for **work with tens and units.**

In all individual work, wherever suitable, chidren are encouraged to write the exercises in their books after working.

MISCELLANEOUS EXERCISES for Children from $5\frac{1}{2}$ to 7.

1.—Measuring Exercises.

2.—Exercises with coins.

3.—Shopping problems.

4.—Halves and quarters. Exercises with tablets of different shapes.

5.—Exercises in capacity.

6.—Exercises in weighing.

The Linay Numeric Demonstrator

By Miss LINAY.

In examining the "Linay Numeric Demonstrator," it must be borne in mind that the designer has always before her the conviction that in the teaching of any subject it is essential to cultivate the gradual growth of knowledge from within the mind of the pupil, in the place of injecting a series of facts from the mind of the teacher into that of the pupil. Upon this basis and with the view to leaving the greatest possible scope for the free play of the pupil's mind, the Demonstrator was designed. The apparatus consists of:—

Set I.—A Board on which numbers slide in a certain sequence. The child can find for himself the result of an addition, subtraction, multiplication, or division, by following the lines of figures, and while doing so learns the reason for the result.

Set II.—Ten strips of wood divided into small squares, with which the pupil can make the same calculation and at the same time see a concrete representation of the figures used in Set I.

Set III.—Duplicates of these squares made to take to pieces, enabling cubic and square measure, fractions and decimals to be taught in a simple way.

The apparatus is based upon the fundamental principle that number is the measurement of quantity and that the only sure guide is the measuring idea.

That the factors in number are:—

(a) The unity (the whole of quantity) to be measured.

(b) The unit of measurement.

(c) The times of its repetition.

Therefore, in every step of the child's first number book the idea of a whole to be measured should be kept prominent.

In using Sets I. and II., the child can make a series of counts with different units of measurement; and can place the answers in rows or columns on Set I. From this, follows a conception of multiplication which in the main should be regarded as finding out more exactly "how much there is in a quantity." The child gains a clearer understanding of the multiplication table and a further meaning of the figures of Set I. by using the strips of Set II. Exercises with Sets I. and II. lead to a clearer conception of the derived unit and of the primary unit of measure. The child is led by using Set II. to see that the whole is made up of parts, so that the difficulties of division are automatically eliminated.

1 2 3 4 5 6 7 8 9
4 8 12 16 20 24 28 32 36
6 12 18 24 30 36 42 48 54
8 16 24 32 40 49 56 64 72
9 18 27 36 45 54 63 72 81
2 3 5 7

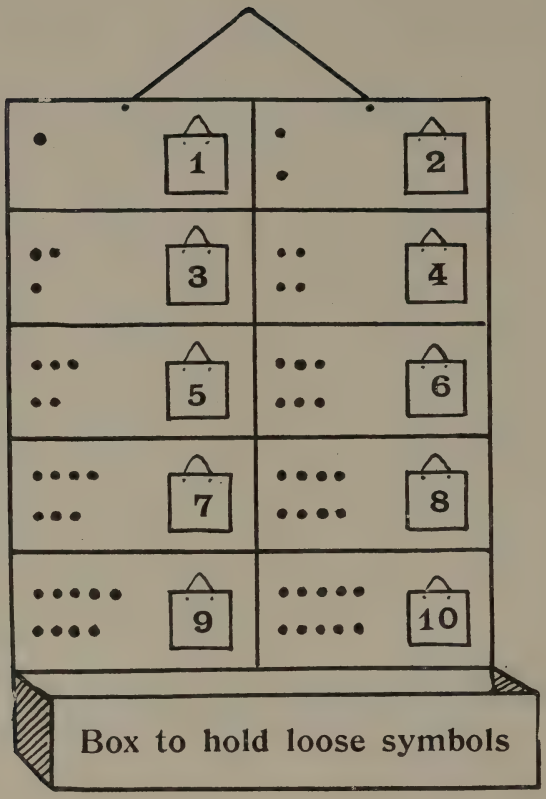
A preliminary exercise with Set III. is the placing of the blocks in their right order, which calls for close application and attention. This set, besides lending itself to numerous exercises on the multiplication table, plainly demonstrates the commutation of factors, and fractions (vulgar and decimal). It also enables square measure and cubic measure to be demonstrated in a manner easily intelligible to the child.

Although a group of children may use a set of the apparatus at the same time, each individual child will find his or her own difficulties and problems, the unravelling and explaining of which will enable the teacher to keep in touch with the mental process by which each individual pupil tackles his problems.

The child who has learnt his arithmetic from this method will have gained a clearer and more definite idea of the meaning of figures in their relation to the business of ordinary everyday life. Also he will not look upon his arithmetic lesson as the most arduous and unpleasant part of the day. Miss Linay has made arrangements by which anyone interested may see the apparatus at the offices of

Messrs. ROLT, J. COOK & HAMMOND,
47 - 49 Tothill Street,
Broadway, Westminster,

who will be happy to answer any questions or give any futrher particulars, either at a personal interview or by letter.



By S. D. KNAPPETT.

This piece of apparatus is for use in the early stages of number. It (a) gives practice in counting, (b) teaches the symbols, (c) teaches the number pictures. It is self-corrective.

Three-ply wood or thick strawboard form suitable material for this. The counters may be painted or stuck on. If wood is used, small dresser hooks can be screwed in beside each number picture, and on these, the loose symbols are hung.

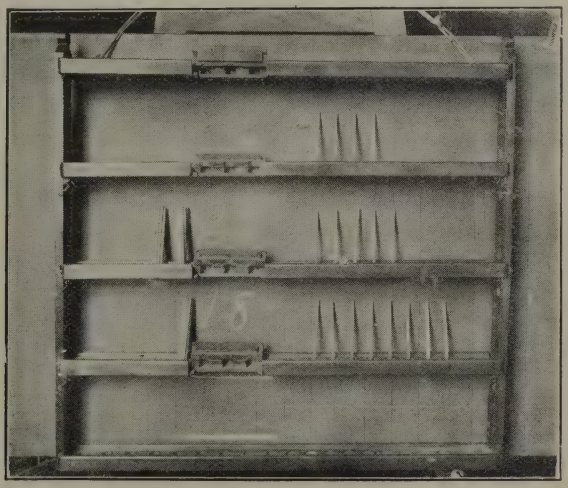
Sleeman's Progressive Individual Number Apparatus.

By E. SLEEMAN.

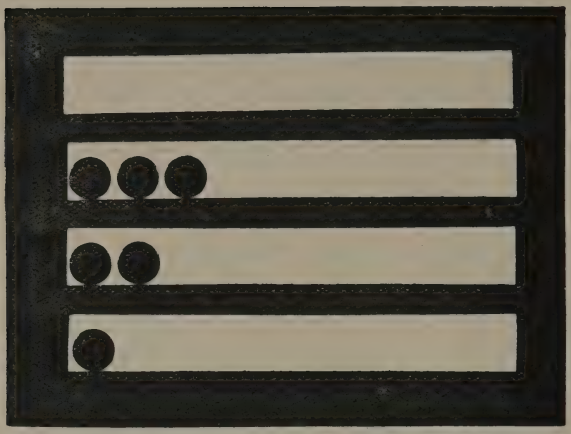
TEN METHOD.

This apparatus consists of (1) A large rectangular wooden frame (Reg. 643,375) with three inner shelves adapted to support objects used to demonstrate number. The shelves are channelled so that the large objects employed in the earlier lessons are in no danger of falling off. (The frame is arranged for convenient hanging upon a blackboard.) Upon each shelf on the right-hand side cup-like recesses are made to receive large balls, when such are employed. In the centre of each recess a small hole is placed for the purpose of receiving a unit stick (see lessons above 10). On the left-hand side of each of the shelves larger recesses are formed, each capable of receiving a bundle of ten sticks. Between the second and third large recess from the unit side a flap occurs. (In dealing with numbers below ten, the frame is used with flap down.)

The raised flap is for the convenience of the hand in recording figures upon a board to correspond with the objects employed in the various operations.



(2) Children's flat frames in cardboard (Patent 20,209). These are in two designs.



No. 1 represents approximately the front view of the large apparatus with flap down, and is used in dealing with numbers from two to ten.

No. 2 represents a vertical section of the large frame and is used in dealing with numbers from ten to the end of Standard I. course.

The objects used upon the wooden frame in dealing with numbers from two to ten, are large attractive ones, such as big balls, dolls, teddy bears, or objects made in the Handwork lessons.

Children working at this stage use draughts or thick counters, and they readily make their objects represent (1) the objects used on the big frame, or (2) the various subjects of the story lessons. In dealing with numbers above ten, sticks are employed both on the large and small frames. The sticks in connection with the former are about five inches in length and of the thickness of a slate pencil, whilst for the flat frames, sticks $1\frac{1}{2}$ inches in length are used.

To aid visualisation, the whole of the objects connected with the scheme are of four brightly contrasted colours.

To obtain the greatest contrast, these are taken in the order of green, red, blue, yellow. Thus "10" would be taken as 3 green, 3 red, 3 blue, and 1 yellow.

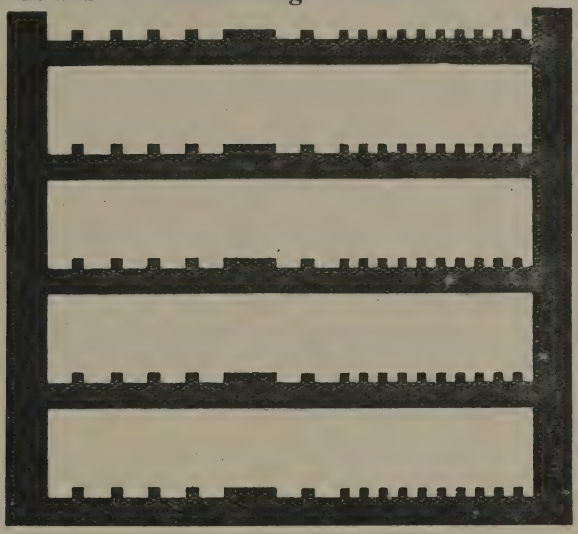
The numbers will be built three upon each tier until all the numbers to 10 have been taken.

The "three" grouping is taken as a "first" grouping for the units, as it is very useful in a great many instances for addition, and it is, to my mind, the best possible grouping for the purpose of subtraction, e.g., the number "8" would be built three on each tier as stated above—3 green, 3 red, 2 blue. When all possible subtractions have been taken from 8 in this grouping, the same

number is built in every other way, and the subtraction afterwards taken in connection with each fresh grouping of the number. All the numbers from 2 to 10 are treated in the same manner. As each number is taken in concrete, the sign for the number is obtained and written.

When the numbers to 10 have been built upon the various tiers, the number 10 is built upon one tier only. One object taken from the 10 and placed upon the tier above, gives $9+1$, another object removed to the upper tier gives $8+2$, another $7+3$, and so on.

Nos. 10—20 and to the end of Stage I. Course.



Work in this stage is done by the child upon No. 2 frame. The last step taken in Stage I. is repeated upon the fresh frame, with, as previously stated, sticks as accessories. The sticks are arranged in the same order and in the same colours as the larger objects. The first unit is put into the unit hole nearest to the centre of the tier, and the work proceeds from left to right as in the earlier stage. Ten unit sticks form one ten, a rubber band is placed around, and the bundle of ten thus formed is placed in the ten space to the left of the bar or bridge. It has been found advisable to keep the two "ten" spaces next to the units for the tens connected with the working of the four rules.

Points in connection with the Scheme:—

1—The subject from the very beginning arouses the keen interest of the youngest child, by reason of the brightness and variety of the objects employed with the frames.

2—The "three" grouping which is taken in connection with the colour scheme as the "first" grouping in dealing with the units, enables the child to visualise numbers with the minimum amount of conscious effort.

3—The Scheme is graded from the earliest numbers to the end of Standard I. course.

4—Throughout the Scheme, except in special demonstration lessons, the teacher shows only on the big frame that which the child cannot discover for himself. The teacher therefore follows the child.

5—Each child is trained to think out the various processes for himself without reference to any other child in the class.

6—Tables to 5 times 12 can be graphically illustrated by sticks on the frames.

7—Thus from the very beginning "Arithmetic" through the concrete is made to live in the child's mind, for he at all times is led to connect "numbers" with "things," and he is thus able to reason out with his objects on his frame, the various small processes for himself in connection with (a) stories told by the teacher, (b) figures written upon the blackboard, (c) varied individual exercises.

Apparatus for Teaching Numbers up to 9.

By V. A. DYE.

I.—Recognition of Groups and Symbols.

(a) **Children match objects and symbol.**

Children given on card picture of one dog with figure 1 at side, two butterflies with figure 2 at side, etc. Loose pictures and figures provided for children to place on top.

(b) **Children associate symbol with object group.**

Child given card on which is picture of one soldier, two birds, etc. Loose figures provided for child to place by side of object group.

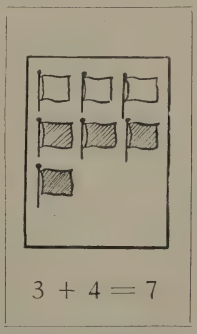
(c) **Children build up number picture by the side of symbol.**

Child given card on which are symbols 1, 2, 3, 4, etc., with spaces at side for child to place corresponding counters.

II.—Recognition and Working of Equations.

(a) **Matching equation under number picture.**

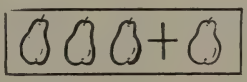
On card are three red flags and four blue flags with equation written underneath. Loose strip provided on which is written same equation for matching.



3 + 4 = 7

(b) **Writing of equation with aid of number picture.**

Following picture provided:—

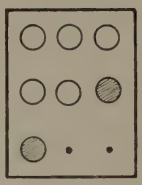


and child writes equation: 3 + 1 = 4.

(c) Child is provided with number card and box containing counters (two colours) and equations to be worked.

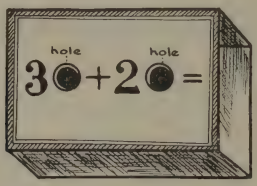
5 + 2 =

Child places on number card five red counters and two green counters and writes: $5+2=7$.

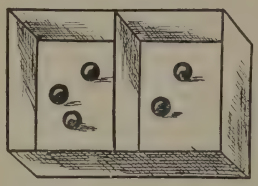


Number Card with Counters placed

(d) Equation worked by child pushing beads through holes in the top of a match box which has a division down the centre. Child opens box and counts beads to find answer to equation: $3+2=5$.

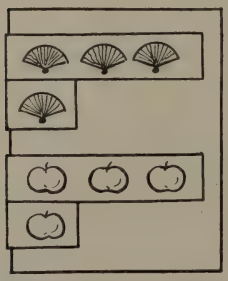


Top of Matchbox

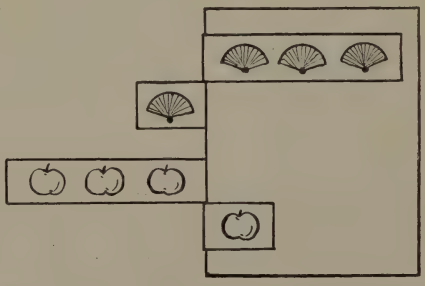


Inside of Matchbox

(e) Child turns back flap on which is picture of one fan and writes 4—1 = 3; turns back flap on which is picture of three apples and writes: 4—3 = 1.



1. Before working equations.



2. After working equations

Brown's Vivid Arithmetic.

By A. BUMPSTEAD.

With the apparatus before us, we should need no explanation of this **truthful, simple,** method of teaching Number to young children.

The chief point is that each number is taught, learned, and remembered **as a whole**—not a series of strokes or dots which, when they get beyond three or four, are the cause of endless mistakes in the children's work. Next in importance is the **vivid colouring** on sheets and tablets, or squares (yet only three colours are used), which immensely **assists the child's memory,** while they are a **delight to work with.** Then each square is of the **same size,** so that the work is **logical:** they are not putting together apples, cherries, currants, etc., all of different size and kind, which must be confusing to the little mind.

The separate squares (or tablets) used by the child make an exact copy of the teacher's sheets, with the advantage that they **are moveable,** so that the squares are **really** added, taken away, multiplied or divided by the child.

For example, let us take the number 6, which ends the first stage (the second stage may be 6 to 10 or 12, the third stage 10 to 20). The child has in his number box for this lesson, six brown squares to make the model picture 6; six red squares and six blue

squares. Having made the model 6, he may lay five red squares, and then make his picture 5 into 6 by **adding** 1 blue square. Next he places one blue square first, then adds the five red. By **taking away** the one blue, he sees that five are left; and after making six again, he takes away the five, leaving one square. The next picture requires four red squares **and** two blue to make six—matching the brown. As before, next build it with two blue first, then the four red. Next **subtract** first the two blue, then the four red.

The next picture is made by three red and three blue; then take away each three in turn. Follow this with 2 + 2 + 2, and 1+1+1+1+1+1 (alternate red and blue) so completing all the pictures of 6.

To multiply, the child sees he must place 1 square 6 times to make 6; or 2 squares 3 times; or 3 squares twice; and thus learns several of his multiplication tables in an easy manner.

For dividing, the child finds how many times he can take away 1, 2, or 3 from 6 with **no** remainder. Also that 4 and 5 can be taken once, but **with** a remainder.

Picture 10. The brown squares which form the model 10 should be **fastened** in proper form to a card, and henceforward called **one 10**; placing one brown square, called one **unit,** at the **right-hand** side for 11, two for 12 ,and so on to 20.

It is also a useful exercise to **draw** the squares with coloured crayons on paper: this improves the figure-printing and tests the memory. The older children can colour and cut squares of cardboard for the younger ones. Squares of one inch are a useful size. A **most useful** book is published with model lessons, teachers' sheets (small), and boxes about $2\frac{1}{2}$ ins. by 4 ins. for the child's squares, by Messrs. Brown, of Leeds.

The A. L. Self-Teaching Number Tablets.

By E. HISCOCKS.

APPLICATION.—The fitting together of various component parts of a number to make that number, and the decomposition of that number into all its component parts.

Two 3's

Three 2's

Six 1's

4 and 2

5 and 1

The apparatus is such that all these pictures of 6 or any other number to 10 (Box 1) may be made and placed side by side. **It is not necessary to destroy one picture of a number, before making others of the same number.** After this practice in the composition of a number, decomposition may follow, e.g. :— 6—2 = 4.

Now reverse the tablets, exposing the figures to view, and the children will have their introduction to sums.

N.B.—Analysis and Synthesis of all numbers to 10 should be learnt.

ARITHMETIC.—Four rules simply.

ADDITION.—**On reversing the tablets** children can see that 4 and 2 are 6.

5 and 1 are 6.

SUBTRACTION.—

1 from 6 leaves 5, 2 from 6 leaves 4, 3 from 6 leaves 3, etc.

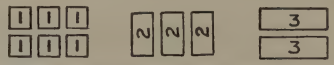
MULTIPLICATION.—

$3 \times 2 = 6$.

$2 \times 3 = 6$.

$1 \times 6 = 6$.

DIVISION.—Take picture 2 and place it on picture 6. It fits on three times; therefore there are three 2's in 6. The same may be done with 1 and 3. There are six 1's in 6, and there are two 3's. Another way is to make 6's of 1's, 2's, and 3's, then divide them up.

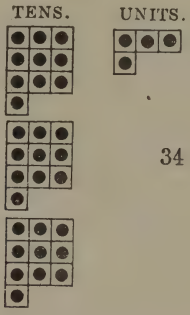


N.B.—All numbers to 10 may be taken in the same way.

For Standard I. ARITHMETIC, **tens will be built up** (tablets grouped in pictures of tens) for ADDITION sums, and the tablets left over, after the **formation of tens,** are the units.

These tablets should be **grouped in picture form** always. For example, the result of adding 18, 9, and 7 together will be shown in three pictures of 10 and 4 units over, which are represented thus :—

The answer is found and the result recognized, without counting—simply by moving the tablets.



Also Subtraction, Multiplication and Division, and Composition of a shilling.

Box 1, for Infants, containing 8 layers of Tablets for showing the Composition of Numbers 1—9 ..... per box, net **10d.**

Box 2, for Infants and Juniors, containing 9 layers of Tablets for showing the Composition of Numbers 1—12

per box, net, **1/-**

THE "A.L." OCCUPATIONS TRAY.

Strong Leatherboard, $12'' \times 9'' \times \frac{1}{2}''$, per doz., net **4/-**

The above will be found specially useful along with the Self-Teaching Number Tablets, in preventing the smaller tablets from being knocked off the desk or dropped on the floor, and so being soiled or lost.

E. J. ARNOLD & SON, Ltd., Educational Publishers,
LEEDS and GLASGOW.

The "Quick-See" Table Chart.

By CHARLOTTE JAMESON.

Explanation of Chart.

Before commencing to present the steps in teaching of this chart, it is essential to give a brief explanation of its main features.

The "abstract" is represented by the figures on the strips, all of which are moveable except the first, and are fitted for turning back over the blackboard at will, exposing the discs which are underneath. These prove the numbers at the side, e.g. :—

1 - - - 3
2 - - - 6, etc.

The **first** or stationary strip is known as the "**group**" strip and represents any "**grouping**" a teacher may wish in a problem.

In **multiplication** and **division** we either combine "**groups**" or separate into "**groups.**" This "group" strip shows the number in each "group."

The number at the head of each moveable strip denotes the **number of groups,** and the numbers below show the **total number of objects in the combined groups.** This will be seen more clearly when two examples of multiplicaion and division are given.

Example I. (Multiplication).

9 boys each had 8 sweets. How many sweets had they together?

1.—There were 8 **sweets** in each "**group,**" therefore we must look to our first (stationary) or "**group**" strip, which shows one vertical "group" of 8 discs with the number 8 at the side to prove it.

2.—There then were 9 boys (each having a "group" of 8 sweets). For 9 "groups" we look for our strip headed 9, which shows 9 "groups" and the number 72 (the total) with 8 in each "group."

Therefore 9 "groups" of 8 = 72.

This can be proved by the strips being thrown back and the discs being shown to the chidren.

Example II. (Division).

25 apples were put into 5 sacks. How many apples were in each sack?

In this case the "**group**" number has to be found.

1.—There were 5 "groups," therefore we look to the strip headed 5.

2.—Our total number which is found on this strip is 25.

3.—Following along from this to the "group" strip, we find that there were 5 in each "group.

Unequal Division can be taken in the same way, the remainders being seen by the children in the form of discs.

Example III.

Mary had 29 nuts and put them into 4 bags. How many could be equally divided into the 4 bags and how many remained?

1.—Following the course of division, we look to the strip headed 4.

2.—Our **total number** in this case is 29.

3.—The nearest number below 29 containing 4 complete groups is 28.

Therefore we have 7 in each bag and 1 over.

The unequal division having been taken systematically through each table, the child, on reaching 10 times and 12 times tables, finds no difficulty in bringing any number of pence to shillings or shillings to pounds.

Steps in Teaching.

1.—Addition and subtraction (with and without figures).

2.—Totting forwards and backwards (with and without figures).

3.—Progress to "**grouping**" with discs and figures of "group" strip.

4.—Multiplication and division.

5.—Division of unequal numbers.

6.—Fractions from halves to twelfths.

7.—Money (pence to shillings, shillings to pounds).

These charts can be obtained from the publishers,

CHARLES & SON, 10 Paternoster Square,
London, E.C.4.

Prices as under :—

The "Quick-See" Teacher's Chart.—Size 20 inches by 15 inches, printed in colours and varnished, net **3/-**; post free **3/9.**

The "Quick-See" Children's Chart.—Size 6 inches by 4½ inches, printed in colours, net **6d.**; post free **7d.**

Recreative Number Games

By G. D. R. BEST.

Directions.

The child picks out a square from the small envelope, works the sum and places it on the square of the large card which corresponds with his answer.

When the card is filled he closes the cover and inverts it. If the sums are correct a complete picture will be seen on the back.

If the picture is jumbled the sums must be re-worked. These games are therefore self corrective.

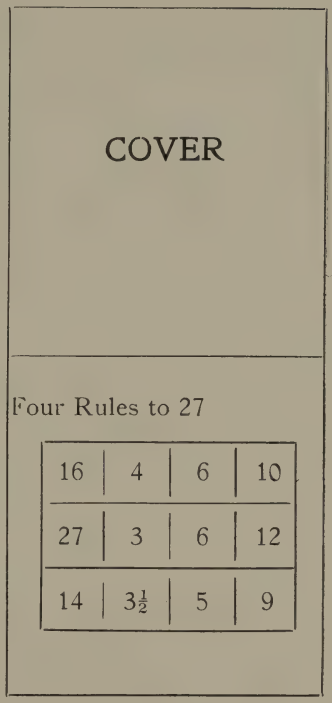
In some cases the questions appear on the large card and the solutions are placed in the small envelope.

No two games are identical. The games are graded:—

1—Simple Addition and Subtraction.

2—Addition, Subtraction, Multiplication.

3—Easy exercises in the Four Rules (see accompanying diagram).



Solution given

8×2	8÷2	8—2	8+2
9×3	9÷3	9—3	9+3
7×2	7÷2	7—2	7+2

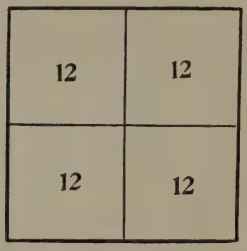
Sums to be worked

NUMBER PUZZLES.

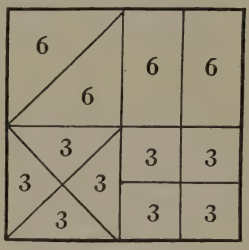
Each child is provided with a large envelope containing a sheet of cardboard divided into four divisions, and a small envelope containing variously shaped pieces of cardboard which are to be fitted into the squares. The five stages shewn in the diagrams are suitable for numbers 8, 12 or any multiples of those numbers.

When the division of the square becomes more intricate, no numbers are used and the boys work the puzzle as an ordinary zig-saw. To prevent confusion, the pieces in one puzzle are lettered A or B or C, etc., on the back, so that lost pieces can easily be restored to the right envelopes.

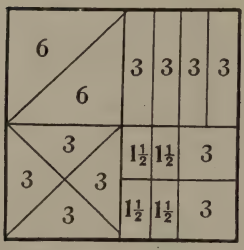
Number Puzzles in 5 stages. Illustrating No. 12.



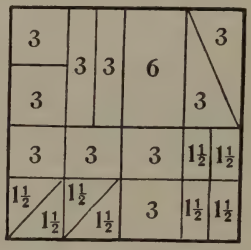
1. Empty card on which puzzle is built



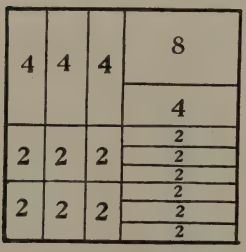
2. Shewing halves and quarters



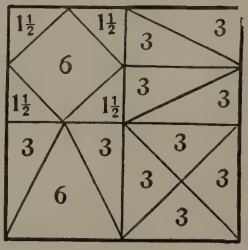
3. Shewing halves, quarters and eighths



4. Shewing halves quarters and eighths



5. Shewing thirds and sixths



6. Shewing halves quarters, eighths

NUMBER SCHEME.

By F. S. WEBB.

STAGE.	DESCRIPTION.	Collective or Individual	SUGGESTED APPARATUS.
1	Numbering and Counting.	In.	Divided Rods. Plain rods of varying length. Bead Chain etc.
2	Numeration and Notation to 10.	In.	Number cards—Counters, Sand paper figures. Printed figures —Playing Cards etc.
3	Number Values.	In.	Number Cards—Dominoes, etc.
4	Numeration and Notation to 100.	In.	Divided Bead Chain. Bead bars in tens. Bundles of tens and units. Figures on card.
5	Addition and (Sign).	In. & Col.	A. B. C. Number Cards. Counters.
6	Subtraction and (Sign)	In. & Col.	As V.
7	Multiplication and (Sign).	In. & Col.	Table Boards—Counters.
8	Division and (Sign).	In. & Col.	As VII.
9	Money — addition and subtraction	In. & Col.	Money Cards — Shopping — Cardboard Coins.
10	Measuring	In. & Col.	Inch Tape and Ruler.

Suggested Apparatus:—

1.—(a) Plain undivided (unless painted) rods of varying length, giving representation of the numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12.

(b) Divided rods (rulers) of varying length as above, each division or section being coloured alternately. Each wooden rod or ruler represents quantity of unity for which it stands.

(c) Bead rods as above for representing progression of numbers 1—10.

2.—(a) Number cards—representation of numbers in groups, e.g.—

etc. Counters for placing on these groups.

(b) Sandpaper figures. Plain figures.

(c) Playing cards.

3.—(a) Regular geometrical shapes to be arranged in order according to number of corners or sides. Figures to correspond.

(b) Dominoes—numbers to be matched. Number boxes—Boxes containing numbers to be filled according to instruction.

4.—(a) Bead chain. Hundred beads on string, threaded in tens, divided by knotting.

(b) Bead bars threaded in tens. Figures 10—100.

(c) Bundles of ten sticks or short bamboo rods with loose sticks—units. Figures on cards to correspond: $10+1$, $10+2$, $10+3$.

5.—A.B.C. of number cards. Introduction of addition sign. These cards contain addition sums—every combination of units possible. Counters or sticks or shells for use with them. Introduction of simplest form of problem.

6.—As 5. Subtraction sign introduced. Every possible subtraction in units used. Counters, etc. Answers to be put in books.

7.—Table boards. Multiplication sign introduced. Small mill boards. On extreme left, statement of table. On right, divisions or boxes in which counters, etc., are to be placed for finding answer.

$4\times1=$		
$4\times2=$		
$4\times3=$		

Answers to be put into pupil's book.

8.—As 7, with addition of division, thus:—

$4 \times 1 =$			$4 \div 4 =$
$4 \times 2 =$	——	——	$8 \div 4 =$
$4 \times 3 =$			$12 \div 4 =$

One aspect of division only introduced, viz., "sharing." If preferred, "grouping."

9.—Money cards or money boxes.
Matching of money tokens or cardboard coins.
Money card problems with pictures and coins.
Shopping orders.
Book of bills for playing shops.

10.—Measuring.
Measuring games, accompanied by apparatus of inch tape, ruler. Instructions for measuring objects in room or cardboard shapes, etc.

The "Muldivadder-Rithmedisc" and Table Chart

Pat. Prov. Prot. 23484/21.

By S. J. PARRETT.

An individual as well as a class apparatus comprising two discs rotating on a central pivot; the top disc having apertures through which numbers on the bottom disc appear.

The top disc also has the shape of an adder drawn upon it, as well as numbers.

The apparatus will show the following:—

1.—Each table (1—12) in one view in rotation.
2.—Each of the tables 1—12 can be shown part by part, as often as required.
3.—Each number 1—12 can be added to the preceding, the answer appearing in the next aperture, when the disc has been turned.
4.—The diminishing of the numbers in the apertures by 1—12.
5.—Every part of the tables can be covered or uncovered at will.
6.—The relation between divisor, dividend and quotient.
7.—The relation between multiplier, multiplicand and product.
8.—The relation between division and multiplication.
9.—Pence and shillings, from one penny to twelve shillings, can also be taught by the apparatus.

Application.

1.—The chart is for table building by using the 10, this being considered the basis of number.

2.—For teaching division and multiplication of all numbers contained in the 1 to 12 times tables.

3.—The chart teaches division of numbers not multiples of the divisor.

4.—The relation between the ordinary 12 times table and the pence table is shown.

5.—By a special method, one of the tables on the chart can be made—

To build up every table from 1—12.
To show the connection between tables and area.
To show squares of numbers from 1—12,
While it is also of use in teaching graphs.

The above pieces of apparatus have been adapted to teach, in addition to the above, division of money, when the sums are exactly divisible by the divisor, and when not multiples of the divisor.

The " Add-away " Rithmedisc

By S. J. PARRETT,

Patent Prov. Prot. 17310/21.

The apparatus comprises two relatively superposed discs working on a central pivot; the bottom disc so marked that certain numbers appear through apertures in the upper disc, on which are also marked other numbers represented by marks, their complements to 10 being further indicated.

The device consisting only of two attached discs is quickly distributed and collected with no loss of its parts, while the multiplicity and variety of exercises are exceedingly advantageous. The apparatus appeals to the children through novelty, movement, colour and simplicity, for even the dullest can understand and work its exercises—which are progressive—while it can be used as a "simultaneous class" or individual apparatus. By turning either of the discs to the right or left inattention is immediately detected.

The device can be called a turning abacus, can be used as a speed arithmetic apparatus, while decomposition and number building up to 100, or even to four figures if required, can be taught. It is a teaching apparatus, not merely a calculator, for each exercise requires the use of at least one mental process.

By means of teeth in certain places, the apparatus can be worked without the operator taking attention from off the pupils, while a slight improvement so that the numbers under consideration always appear in an upright position, has been added.

A special pointer has been devised to cover or disclose one more or all of the constituent parts of a number.

The Rithmedisc teaches the following:—

1.—Every pair of numbers making totals of from 1 to 10.

2.—Every three numbers making totals up to 10, by a new method.

3.—The numbers 1 to 9 to 10.

4.—The totals of every pair of numbers between 10 and 18, neither number being 10, thus, by a simple method, bridging the tens and units.

5.—The joining of every tens number joined to a unit, making an exact ten.

6.—Increasing every number by 10, until the ten nearest the 100 is reached.

7.—Adding 1—9 to every number from 0—91, each number being added an equal number of times.

8.—Connection between pence and shillings, with subtraction of pence from the shilling.

9.—Synthesis and analysis of numbers from 1 to 100 by a special pointer, or by means of the spaces between the apertures.

10.—A speed apparatus for tot work.

The apparatus has been adapted to teach:—

(a) The composition of the 10, with the subtracting of either or both of the complementary parts.

(b) The composition of the shilling with its addition and subtraction of both parts.

(c) Money from one penny to twelve shillings.

Greir's Number Games

By T. E. GREIR.

These games were devised to aid the development of speed and accuracy in the elementary processes of the four rules in Arithmetic. They give varied and repeated practice in the four operations by means of interesting and competitive play-work. They are intended to follow the teaching of the concept of number, and the first lessons on the four processes; and will, by providing a multitude of arithmetical experiences, greatly aid the children in memorising the facts of the multiplication and addition tables.

The games are played by children in pairs, each child having a set of twelve counters numbered from 1 to 12, and a scoring card is placed between the two children, the counters being put on it as the game proceeds. The winner is the child who has most counters on the card.

There are **ten separate games,** six of which are suitable for Infants:—

Set I.—Addition, up to $12+12=24$.
Set II.—Subtraction, up to $12-12=0$.
Set III.—Multiplication, up to $5\times5=25$.
Set IIIa.—Multiplication, up to $7\times7=49$.
Section IV.—Division, up to $25\div5=5$.
Set IVa.—Division, up to $49\div7=7$.

These can also be used in the lower classes of the upper departments, as well as the remaining four sets:—

Set IIIb.—Multiplication, up to $9\times9=81$.
Set IIIc.—Multiplication, up to $12\times12=144$.
Set IVb.—Division, up to $81\div9=9$.
Set IVc.—Division, up to $144\div12=12$.

These Number Games have been produced by the **Educational Publishing Company,** of 9 Southampton Street, Holborn, W.C.1, and are sold in boxes of 20 scoring cards for each set, with a copy of the rules of the game, for **2/-**. The counters, in packets of 240, cost **6d.**

RECORDS

READING

By A. ROBINSON.

All apparatus numbered. Children work through apparatus in order, and receive mark in Record as each piece mastered.

	1	2	3	4	5	6	7	8	9	10	REMARKS
Dark, Gordon =	/	/	/	/	/						
Maynard, John =	/	/	/	/	/	/	/				
White, Frank =	/	/	/								

By E. M. LAW.

Method of keeping Records:—

The grades of difficulty are indicated on the apparatus with coloured papers, corresponding with similarly coloured steps on a small ladder hung in the room.

Each child is tested at intervals in the work of his stage: when he can do it without help, the date is noted in the record, and he may then choose from the apparatus of the next stage.

SPECIMEN OF RECORD.

NAME	Stage 1. Grey	Stage 2. Light Green	Stage 3. Blue	Stage 4. Bright Green	Stage 5. Red
G.B.	20.11	14.1	21.3	—	—
L.E.	3.11	10.11	1.12	10.1	4.2
A.W.	18.12	15.2	—	—	—
M.H.	3.11	10.11	18.12	4.2	—

An Easy Method of keeping Records

By L. E. MURRAY.

LADDERS.

They appeal to the child and are easy for the teacher.

Explanation.

1.—At beginning of term, each child is given a **Ladder,** which is simply a piece of cardboard, on which is drawn an outline ladder with numbered steps.

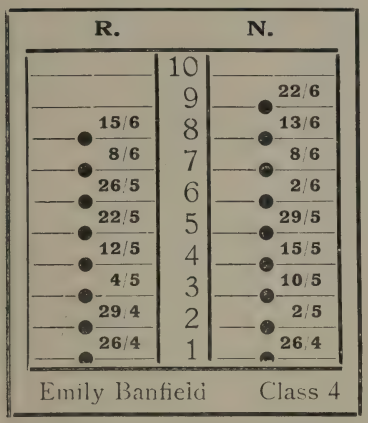
2.—The children in the Lower Classes have a double ladder for Reading and Number (see below). The children in the Upper Classes have a single ladder for Number (see Card 2).

3.—The Syllabus in Reading and Number is drawn up in **steps** to correspond with the numbers on the ladder.

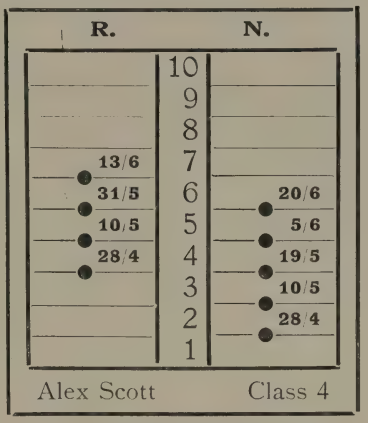
4.—When a child has mastered a "step" of the Syllabus, it is marked with a **dot** and a **date** on the ladder step by the teacher, and the child can then pass on to the next stage of the work.

5.—Each child is responsible for the safe keeping of its ladder (usually in its bag).

Specimen LADDERS and STEPS in Reading and Number in Class 4. (Grade III. b)



This child returned after 8 months absence with ringworm. She commenced at bottom of ladder and quickly stepped up. She was promoted to Class 2 on 26/6/22.



This child is an average child Came up with the teacher from Class 5

STEPS FOR RECORDS.

READING

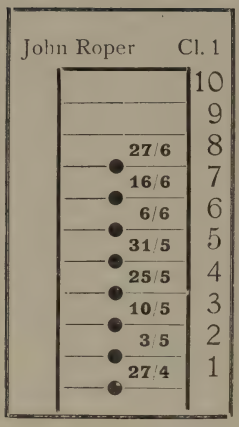
1. Consonants and Short-Vowel sounds.
2. Three letter names with short vowel (bat, cap, cat, dog, peg, pin, fan, etc.)
3. Word building—three letter names and parties of words.
4. Sentence making and reading—learning easy words without sounding (it, is, on, an, in, etc.)
5. Irregular words, 3 sets, (e.g., by, my, do, to, the, me, he, she, we, etc.), and reading Primer I.
6. Double consonants (th, sh, ch, etc.)
7. "Partners" in Prim. II., and word building.
8. Reading Primer II.
9. Irregular words—more difficult.
10. Reading Continuous Readers.

NUMBER

1. Recognising Nos. to 10. Recognising groups of Nos. making 10.
2. + equations made and learnt to 10.
3. — equations made and learnt to 10.
4. + and — learnt to 10.
5. Addition and subtraction sums to 10.
6. Knowledge of Nos. 11 to 20.
7. + equations to 20.
8. — equations to 20.
9. Addition and subtraction sums to 20. No carrying fig.
10. Times sign × learnt. Building up twice and three times table. Multiplying sums to 20 (no carrying).

NOTE.—The Syllabus covers a wide area because of children admitted who must commence at the beginning

UPPER CLASSES
LADDERS FOR NUMBER ONLY



"Steps" in Syllabus.

10. Any sums outside the Syllabus.
9. Easy money sums in + and —.
8. Easy problem sums in four rules.
7. Division with remainders.
6. Revision of "1 to 5" (to 6 times table).
5. Subtraction—equal additions.
4. Division without remainders.
3. Multiplication with 2, 3, 4 times table.
2. "Simple" Subtraction.
1. Addition of Tens and Units.

Explanation.

In classes 1 and 2 (Standard I. a and b) ladders are kept for Number only, as the majority of children in these classes can read and only need practice in this subject.

1.—The Number syllabus is graded in **steps.**

2.—The number box (or boxes) contains **numbered** and **graded** sum cards to correspond with the steps in the syllabus and on the ladders.

3.—Each child has its ladder to keep in its sum book and bag.

4.—At the beginning of term each child is tested and its ladder marked accordingly.

5.—The child works at the sum cards for its appropriate step, and when the teacher is assured that the child has mastered that step, she marks it on the ladder and gives the child permission to proceed to the next step.

RECORD GRAPH

By C. M. A. COOMBS.

Name.—E. S.

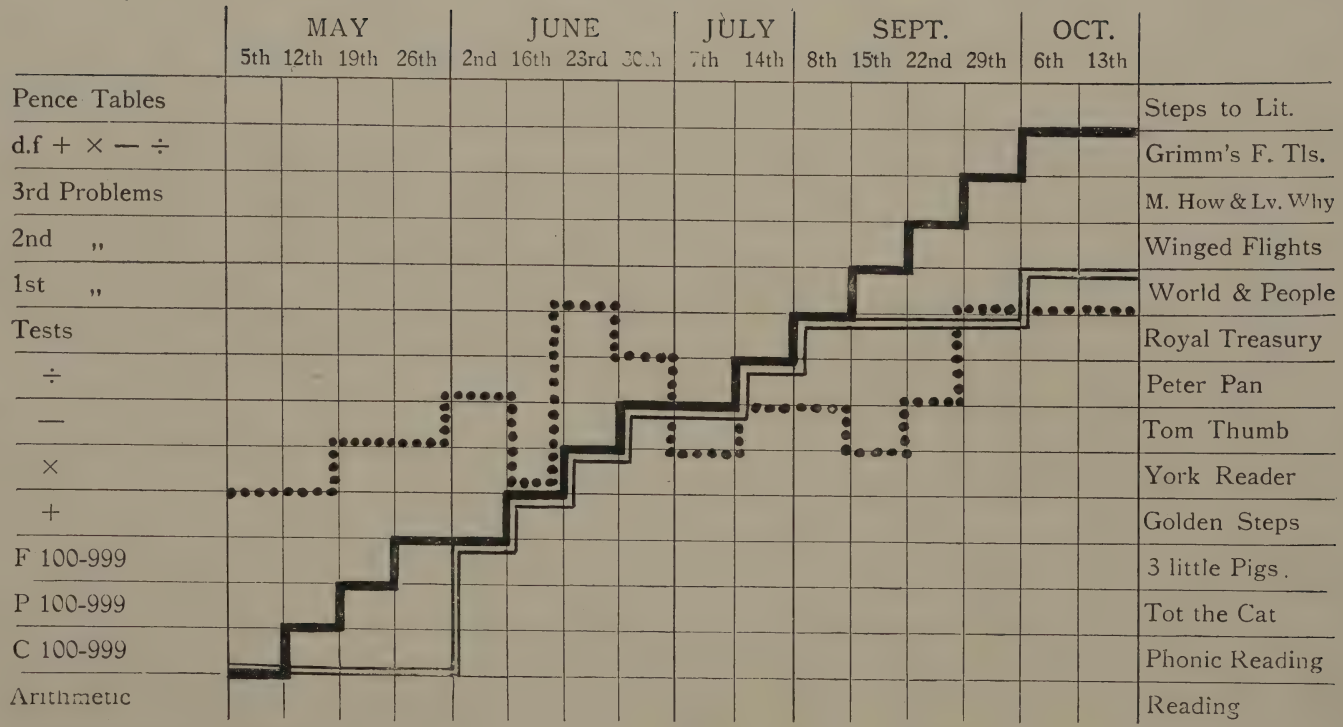
Birth.—25/3/15.

Age.—7 yrs. 7 mths. on 25/10/22.

Characteristics.

An intelligent little boy. Shy but a hard worker. Very fond of sums.

[See over.



Red (thick line)—**Reading.**
Blue (double line)—**Arithmetic.**

Green (dotted line)—**Writing**
(carries numerical mark—maximum 16).

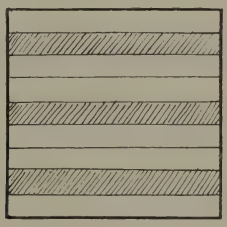
Apparatus for Individual Work for Three Year Olds

By I. FLATTELLEY.

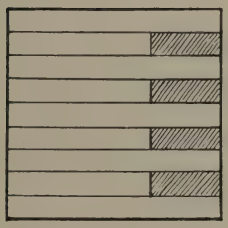
All the following pieces of apparatus are among those used in the Baby Room.

1.—**Judgment of Length.**

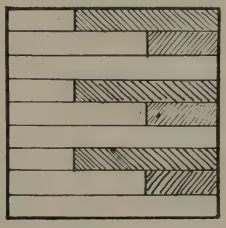
A.—Old mat-weaving strips used for this apparatus.



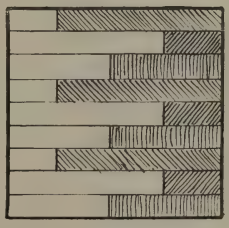
A.—In each case the shaded part is cut off.



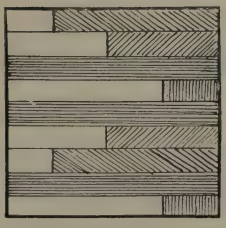
B.—Strips of 1 length



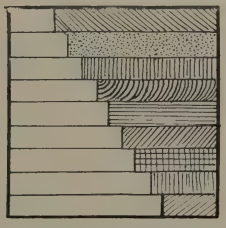
C.—Strips of 2 lengths



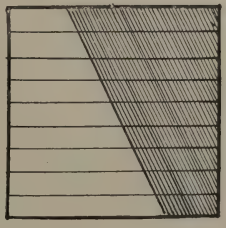
D.—Strips of 3 lengths



E.—Strips of 4 lengths



F.—All different

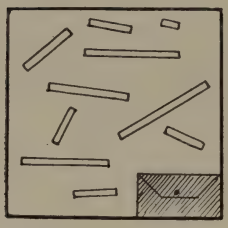


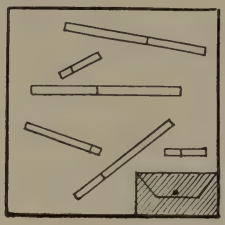
G.

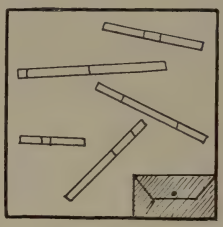
The shaded portions are cut off and placed in an envelope attached to a card on which the remainder of the strips, i.e., the light portions, have been fixed. The children replace the pieces, completing the strips. Diagrams A, B, C, D, E and F, show various stages with strips cut at right-angles. These steps are repeated until stage shown by Diagram G is reached.

2nd Step.

Cards with oblongs of various sizes. Children fit strips into them.







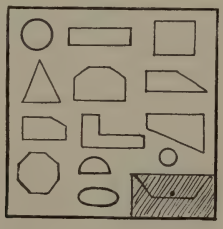
A.—Each oblong has to be fitted with **one** strip.

B.—Each oblong has to be fitted with **two** strips.

C.—Each oblong has to be fitted with **three** strips.
(In each case the strips are of the same width.)

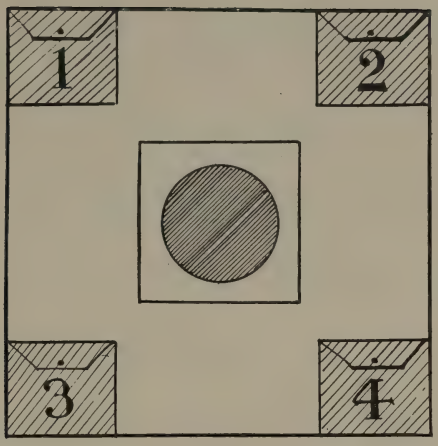
Shape Fitting.

Cards with geometrical shapes drawn. Children fit cardboard shapes into outlines.

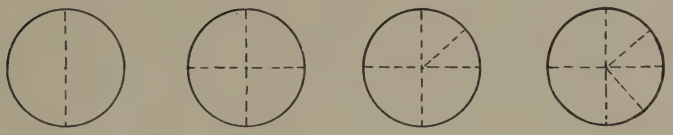


Divided Circle.

Photograph mount is fixed on a card. Bags containing cut circles, whose pieces will just fill shaded portion.



A.—White B.—Red C.—Blue D.—Yellow



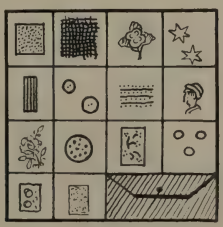
A, B, C, D show cuts. Pieces are placed in bags, 1, 2, 3, 4. Each bag is coloured as disc, so that pieces may be correctly placed.

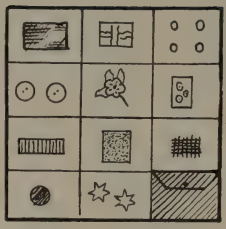
This also carried out with—

(a) Oval; (b) Square; (c) Oblong; (d) Pictures.

Matching.

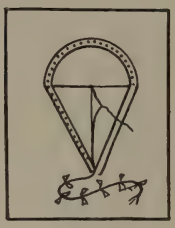
Cards with various material attached, e.g., Wall-paper, material, sand-paper, scraps, pictures, coloured stars. Also a bag containing duplicates. Children pair them.





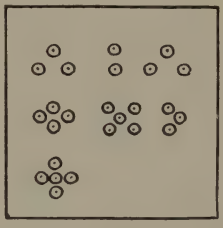
Cards with pieces of velvet, sand-paper, fur, etc., to be matched without looking.

Outlining.



Copies of simple, well-known objects outlined with split-peas.

Afterwards letters and designs are attempted.



Recitations for Little Children

By GRACE M. TUFFLEY.

The aim of the writer of these Recitations was to combine simplicity of idea with simplicity of expression and thus provide verses which little children could read and understand with little or no assistance from the teacher. If children are accustomed at a very early age to reading verse, however simple it may be, they will be far less likely to exhibit that disinclination for the study of poetry which is characteristic of so many children in the upper standards. They acquire a sense of rhythm, their vocabulary is enlarged, and the associations they form are happy ones. They make themselves at home in an atmosphere of simple verse, with the result that later on they are able, and eager, to find their way alone in the realms of real poetry.

The Recitations deal with things which constitute the child's environment: its toys, its pets, little incidents which help to make up the history of its childhood. It has been found that children turn to the verses and learn to recite them of their own accord. They are no longer dependent on the teacher's interpretation, but become their own interpreters. The following is one of the shorter Recitations:—

"I'm standing in the dancing sea,
Not very far from land.
The little wavelets run to me,
And tumble on the sand.
And do you know what I should wish,
If someone said 'Suppose—'?
I'd *love* a tiny silver fish
To swim between my toes!"

"Recitations for Girls and Boys," by Grace M. Tuffley, is a companion book to "Recitations for Little Children," but is intended for the use of girls and boys between the ages of 6 and 10. Again the writer's aim was to enable the children to act as their own interpreters, and in order to do this, a certain simplicity of thought and action had to be maintained.

Each of the foregoing books may be obtained from—
THE NATIONAL UNION OF WOMEN TEACHERS,
39 Gordon Square, W.C.1.
Price **1/-** net. Post Free, **1/3.**

Scholar's Notebook

By L. VELLENOWTH.

Purpose.

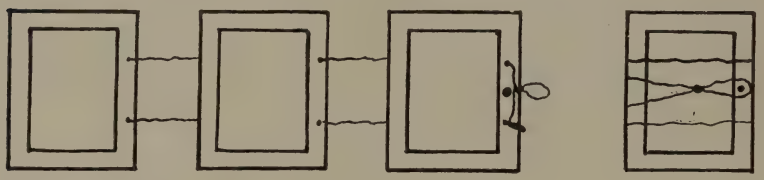
To supplement the teaching of tables—to emphasize the "times."

To supplement the teaching of sentence framing.

To provide variety in nature study, etc.

Description.

A series of frames (not more than four or five) made of American cloth, size about $4\frac{3}{4} \times 3\frac{3}{4}$ inches, on the model of the slip-in photograph frames. One long side of each frame pierced in two places, and through these holes Macramé thread passed in such a manner that when book is open the frames lie side by side (fig. 1); when closed, on top of each other (fig. 2). A boot button is sewn on one frame and the thread tied in one place to form a small loop, in order to keep book closed when not in use. White or brown paper is cut into the requisite size and slipped into the frames from below. This renewed when necessary.



Use.

1a.—In table exercises, e.g., $3 \times 4 = 12$, the required number of objects—marbles, cherries, etc.—drawn on each frame (in this case 4 marbles—1 frame representing 1 time). $3 \times 4 =$ written down on paper, millboard, etc. From the frames lying side by side, the answer is discovered and equation completed: $3 \times 4 = 12$.

1b.—Four marbles drawn on first frame, which is then turned over and behind the last one, this process repeated three times in all. What is the answer? Child "peeps" to see whether he is right, then corrects or completes the equation.

2.—In sentence framing, the teacher or child writes a word or words in one frame; child makes a sentence containing those words in another.

3.—In nature study, etc., the "Notebook" carried to playground, school garden, etc., and record of visit made on the spot.

Scholar's Box

By L. VELLENOWTH.

Of strong thick cardboard, metal edged. Size about $11\frac{1}{2} \times 7\frac{1}{2}$ inches, outside measurement; depth not under 4 inches; with deep lift-off lid, thumb-holed. The box contains a tray sunk to the depth of 1—$1\frac{1}{2}$ inches from the top of box. This holds the papers and books of the child, while the lower part of box carries the ordinary small boxes, etc., in use. The tray to be placed within the lid beneath the box when necessary.

The box has been made by—

G. F. KETTLE, 9 New Oxford Street.

The cost—

1 doz. at **36**/= net. 3 doz. at **30**/= per doz.
6 doz and over at **24**/= per doz.

The Elements of English
through
Thought Expression & Number

By J. M. BENTON, Sidney, Australia.

The Educator has a very definite objective in the creation of a new social order. It is to create an environment, supply means and develop a method, by which the individual may achieve freedom—freedom being reckoned as the wages of obedience to natural and rational law. The environment needs to be that in which (a) laws of these kinds exist, (b) the means will satsify all the vital needs of the pupil, and (c) the method should develop the full value of this "law" aspect of vital experiences.

The more restricted schooling aspect of education will develop through language. Each pupil will observe, examine, describe, invent or create in a due sequence. To ensure the full fruit of this course, a large living vocabulary, and reasonable facility and precision in its use, will be essential. The ability to acquire and use this vocabulary will be evidence of normal capacity—a vital intelligence test. This objective will require a very considerable development of oral language before the introduction of visible symbols. Vocabulary, pronunciation, enunciation, practical phonetics will be learned thus.

The development of speech in this wide aspect being postulated, the pupil may be led to the construction of an alphabet. Construction is necessarily a law-abiding effort. It is never a mere dexterity, though it is possible for the laws to be assumed. The alphabet, in this plan, has therefore been reduced to a simple exposition of the limits of the geometrical forms of the letters. These forms are constructed with "sticks." The sticks are objects to describe. With three different lengths of sticks, seven elements of letters and twelve letters may be formed. Thus a complete phonetic alphabet of forty-six signs is constructed, by using six lengths of sticks. Each sign represents one sound which the pupil has previously used and isolated, eg.., **i** as in 'it,' 'if,' 'in,' and **u** as in 'nut,' 'cut,' 'but,' etc. All the signs are based on conventional letters of current script style. The construction is without any copy other than the demonstration given by the teach-

er with the material used by the pupil. The child thus learns the sound, the shape, and the name of the letter. The teacher ensures a real complete knowledge of the constructive operation by requiring a description of the effort. Through this description, the pupil may be led to discover the points in the construction in which it is possible to effect improvements. No blame needs to be affixed to any effort where there is evidence of desire to improve. The teacher should very rarely judge, except by commendation, the pupil's effort—the child is to be trained in self-criticism. Sticks are used to permit the improvement of the constructive effort without the need of destroying it.

When the result is satisfactory, the letter is copied in embroidery on a card. The letters thus made are arranged in an indexed box and used for word building. The word building ensures two results—a record of the child's pronunciation and also of the sounds that he hears, The separate letters that form a word are then combined on one card and letter junctions are studied. This leads to an extension of the idea of law or rule.

The next stage is to form the letters and words in plastic material. The convenience of curved links and junctions is observed and opportunity is afforded for display of more exact knowledge of form and greater skill in making it. This knowledge and skill should be the "discovery" of the pupil, not the short circuiting dogmatism or direction of the teacher.

This plastic form should then be used as a model for training to write a fluent or current style. As the letters are proportionally uniform in every stage throughout this course, there is no change in shape to cause distraction or embarrassment. Before pen writing begins, the pupil should observe the most economic position for body, arm, hand, fingers, and instruments. This does not necessarily mean the position most readily adopted by the pupil at the outset. The anology of stance, or position, in all effort, whether of constructive or exercise type, is useful—piano playing, sawing, filing, cricket, rowing, tennis, and golf, will each supply instances—to impress on adults the desirability of observing and using the method of the expert. The objective is **economic** effort, not the imposition of arbitrary demand by the teacher, not the display of irrational anarchic self-assertion by the pupil.

Pen writing and print reading should begin about the same time: after the pupil has achieved knowledge and power to express his, or her, own thought in appropriate language and in correct grammatical form through the phonetic mode of presentation. The stage from the phonetic to conventional form may be taken by introducing a printed story or rhyme that the pupil has memorised;

e.g., "The House that Jack built," Froebel's "How Lena learned to Write and Read" (Pedagogics of the Kindergarten), is suggestive at this stage.

Reading, as a mere dexterity, is not necessary as a subject in this course. It is the complement of the visible thought expression. The apperceptive conditions and active vocabulary which are essential to intelligent vital reading are cultivated through the oral methods postulated.

Number ideas are demonstrated by a set of blocks which may be built up into any form—linear, superficial, or cubic—that may be desired. The blocks may be used in the realization of the digite; analysis and combinations of number within those limits; the operations of association and distribution; the varying values of units; tables, factors, fractions—comparative and operative. Sum of series, proportion, averages, permutations, combinations, construction of squares and cubes—binomial and multinomial—and the graph of a variable function may be shown from the arithmetic, algebraic, or geometric aspects. Any proposition that may be set out on squared paper may be demonstrated with, or upon, these blocks. The same set of blocks may be used from the "Babyland" course to the High School; as every idea that may be expressed in right lines, in any or all of the three dimensions, with any scale of notation, may be illustrated by it.

The device may also be used to represent ideas of historic sequence, geographic proportions, and graphic representations of production and distribution.

Generally, the objectives of this course in language and number are to create appetite for, and to assure ability to asimilate, intellectual food through a balanced development of physical and mental power by the cultivation of the senses to perceive, of the reason to desire, of the will to achieve, more abundant life from the inter-related social and individual aspects.

Individual Time Tables through House Organisation

By M. O'BRIEN HARRIS, D.Sc., London.

A.—The school has over 400 girls, normally arranged into Junior Forms (100), Houses (300), Form VI. (20). The exhibits, mounted on a series of large cards, illustrated:—

1.—The School Organisation, shewing—
   (i.) The Forms (horizontal divisions) below the Houses and above them;
   (ii.) The Houses, 5 vertical divisions (Athens, Florence, Rome, Venice, Winchester) in which the four years from 12 to 16 are passed, each of the 60 girls remaining four or five years with the same House Mistress.

2.—The division of the Syllabus into stages, 10 in each subject; of these
   1 and 2 are taken below the Houses;
   3 to 7 are taken during the first three or four years in the House;
   8 to 10 are the work of the year of the First School Examination (matriculation standard).
   Post-matriculation work (Form VI.) was not represented.

3.—The adaption of one of the House stages to the work of a term was illustrated in certain subjects shewing the division of the syllabus into—
   (i.) the work taken in class;
   (ii.) the work to be taken independently, set out on "cards" with—
      (a) Suggestions for reading.
      (b) Topics to be worked out.
      (c) Exercises—charts, diagrams, maps, etc.
      (d) Typical questions to be answered or prepared.
   (iii.) Exercise books showing work done under i. and ii.

4.—Record cards. One double card, $6\frac{1}{2} \times 8$ inches when folded, serves for a four years course in the Houses and is kept by each girl, a single card of the same size serving as the House Mistress's duplicate.

A numerical mark each term opposite a subject shows the stage taken. Its colour, with addition of asterisks or a query mark, shows the quality of the work done in 5 grades from "failure" (black with asterisk) to "a very good pass" (red with asterisk).

Almost at a glance, a girl's progress and quality of work is obvious to herself and her parents, and to any mistress. Late and absent marks each term, and height and weight are also recorded.

5.—The History scheme for Stages 1 and 2 was also shown. It is carried out in part by a card encyclopædia on the lines of Mr. McMunn's General Card Encyclopædia, and is a good basis for individual work.

B.—The principles behind this practice are numerous, and are connected closely with various facts. They may be (quite inadequately) set forth as follows:—

1.—There is no average girl. Each girl's needs vary with many varying factors, including (among others) age, previous education, natural ability, home environment, temperament, health. The value of most of these factors changes from time to time and from subject to subject; so that their product in any one connection is incalculable. The girl herself may perhaps have some intuitive knowledge of it.

2.—Hence the curriculum must be
(a) varied to meet various needs;
(b) as far as possible optional, to suit individual needs.

3.—It is essential that a girl should be able to make her own pace in each subject and neither be retarded nor pressed forward for the sake of others. This is provided for by the stages in each subject and the limitation of their number.

4.—Limitation of the number of subjects taken at a time is essential, lest there be indigestion and non-assimilation. The desired object, an uncongested time table, is secured by making the number of stages (five in most subjects) fewer than the terms (nine in normal cases) available for taking them. Usually each stage of each subject is offered each term. A girl chooses the subjects of her individual time table each term; but her choice may be limited by her inability to be in two places at once, or the greater claims of others to fill up the available places in a class. Such limitation is, however, not arbitrary, and its cheerful acceptance

is a preparation for the work of the world. Time and tide wait for no man.

5.—It is desirable to make the best of present conditions of school life, in the interests of the present generation. For example, the First School examination is a requirement which must be met. Any of its regulations disapproved of may be fought against on some other ground. In the school they cannot be ignored.

6.—Class teaching is too valuable to be rejected. Though there is not in our present scheme so much of this as formerly, we recognise its uses in education, among them inspiration, economy of effort, co-operation in work.

7.—School requirements must be not only "definite but finite" (G.B.S.). A girl should know what is expected of her if she is to undertake responsibility for herself. She should know both minimum and maximum of what she *must* do; and have the opportunity of choosing where she will launch out into the infinite. Art is long, life short.

8.—Art and Handwork for older pupils are what Dr. Montessori's "Exercises of Practical Life" are for young children. They must be available for a considerable part of the day as a relief from and stimulus to intellectual work, as a means of self-expression, as an introduction to other parts of a girl's nature, other parts of the universe than she would normally become acquainted with—as well as for practical purposes. Hence there are obligatory stages in some and optional stages in others of the following: Drill, Needlework, Drawing, Music, Writing, Spinning and Weaving, Gardening, Cookery, Woodwork.

9.—Human relationships are an important element in training. Their continuity within a slowly changing group, the House, is a less artificial arrangement and hence a better preparation for life than the abrupt changes in Form Life. It is possible for a mistress to get to understand a girl and to know her parents during four years, in a way impossible during the one year spent in a Form. There is natural intercourse between the older and younger girls, and the chance of a wholesome form of responsibility and dependence. Intellectual superiority is not the sole factor in determining a girl's position in whatever hierarchy may exist in the House. School citizenship, on this basis, requires qualities practically the same as those needed in the life of the world.

C.—The aims as set out (for official use) early in 1920, before the scheme was put into practice in September, were :—

1—(a) Greater latitude in Middle School as regards choice of time at which subjects shall be taken ; and hence greater responsibility on a girl for her intellectual development.

(b) Greater homogenity in each teaching group.

(c) To raise the intellectual tone and the educative value of much of the school work by securing the active co-operation of the pupil, valuable psychological elements being called into play.

(d) To avoid some of the evils of specialisation by replacing a succession of form mistresses by one House Mistress during these years.

2.—Subsidiary aims were at the same time set out as follows :—

It will be seen that in attempting to reach the ends already mentioned, several other important results are also secured :—

(a) Homework and schoolwork merge.

(b) The use of Library and books of reference is encouraged.

(c) An individual time table for each girl gives suitable scope for various types—intellectual, artistic, apparently dull.

(d) Education for leisure is provided for.

(e) Some of the evils of an overcrowded curriculum are avoided.

(f) Light may be thrown on various problems : as to the appeal of different subjects, intensive work, the relation of manual and intellectual subjects, and others of equal importance.

Note.—A fuller account of the plan is to appear in the autumn, 1923, as a book entitled "Towards Freedom : the Howard Plan of Individual Time Tables." Publishers—The University of London Press, Ltd.

By Wm. H. WHITE, A.C.P.

Synopsis.

1.—Ramble Club Sheet.
2.—Individual Work in English (Standard VII.).
3.—Individual Work in Science (Standards V., VI., VII.).
4.—Drawing Suggestions for Upper Standards.
5.—Reading for Information.
6.—Hardy extracts as prose models for descriptive work.

Explanatory.

1.—The Marcian Ramble Club is a voluntary association of boys in the school who go on rambles on whole holidays and Saturdays. Every one pays his own expenses (reduced fares for a party), carries lunch which is eaten al fresco, and joins in a common tea. The leaders go over the ground previously, using the 1 in. and 6 in. Ordnance Survey maps, and plan the route to be taken, arranging places for lunch and tea and convenient spots to halt at for a short talk on the contour, etc., of the country. The essence of the rambles is the freedom from unnecessary restrictions, scholastic or otherwise. The places visited include Chenies, Box Hill, Leatherhead, Guildford, The Pilgrims' Way, Compton, Shere, Denham and Headley.

2.—English work for private study periods. A set of 40 cards was made up on the extracts given in the class literary reader (The Temple Reader). Each card has its number, the page and title of the extract referred to and a series of two or more questions on the matter read. These questions are devised so that it requires definite thought to answer them (a sample card is copied below). The answers are written in the class exercise books and marked in the usual manner.

Card 19. Temple Reader, p. 139.

La Belle Dame Sans Merci.—Keats.

What does the title mean? Describe the scene. What time of day and year is it? How do you know? Describe the knight. Tell his story in prose. What is the note of the poem? Do you like it? give reasons. How does Keats get the mournful effect which is so noticeable in the poem? He describes the lady by mentioning only three things about her: yet we have sufficient to picture her. Attempt this.

3.—Individual work in Science. A set of cards was prepared for each section of the Science syllabus, so that a pair of boys could take a card, get the apparatus required (it was tabulated at the top of the card) and get to work. In this way the whole class can be set working very quickly and all may do practical work, though the amount of apparatus available is limited. The exercises set include measurement of length (height, dimensions of class room, size of cupboards, marking out football and cricket pitches, size of books, etc.), area (size of rooms, area of tables, etc.), use of chain, yard stick, tape measure, two-foot rule; and exercises in volume, using pint, quart and gallon measures, and graduated jars, pipettes, photographic measures, medicine bottles, etc. Exercises with the greengrocer's scales and the delicate chemical balance are followed by the use of an Archimedes balance made at the handicraft centre. Another set of cards in course of preparation is more ambitious. It gives instructions for the performance of certain simple experiments and asks in every case for the performer to record (a) what was used, (b) what was done, (c) what was observed and (d) what was the reason for this.

4.—A sheet of drawing suggestions showed specimens of a set of drawings which had been copied on a reduced scale from various pupils' books and hektographed so that the whole of a class could study them at once.

5.—About 200 cuttings culled from many newspapers and each one cut out and mounted on a piece of brown paper with one or more questions on the back, form the collection of sheets we title Reading for information. The questions are designed to test whether the pupil has read the extract carefully or not.

6.—A number of descriptive extracts have been copied out of the works of Thomas Hardy, and these are distributed to the class to study how a master hand has used his material and to see what material he chooses and how he moulds it to his purpose. Each child is asked to write down for future guidance any word or phrase which appears to him to be apt or useful. Again, a composition is set on "A Walk through a Wood at night." This done, the class are set to study the first page of "Under the Greenwood Tree" and note how it should be done. A gradual improvement is found in all pupils and in some, to whom the style appeals, an amazing difference is noticed. The danger to be guarded against is that of mere unintelligent transcription, but this is easily discerned.

English Civilisation

By C. M. A. COOMBS, L.L.A.

NOTE.—Study continued on these lines would lead to an understanding of the history of :—

1—Art

2—Agriculture

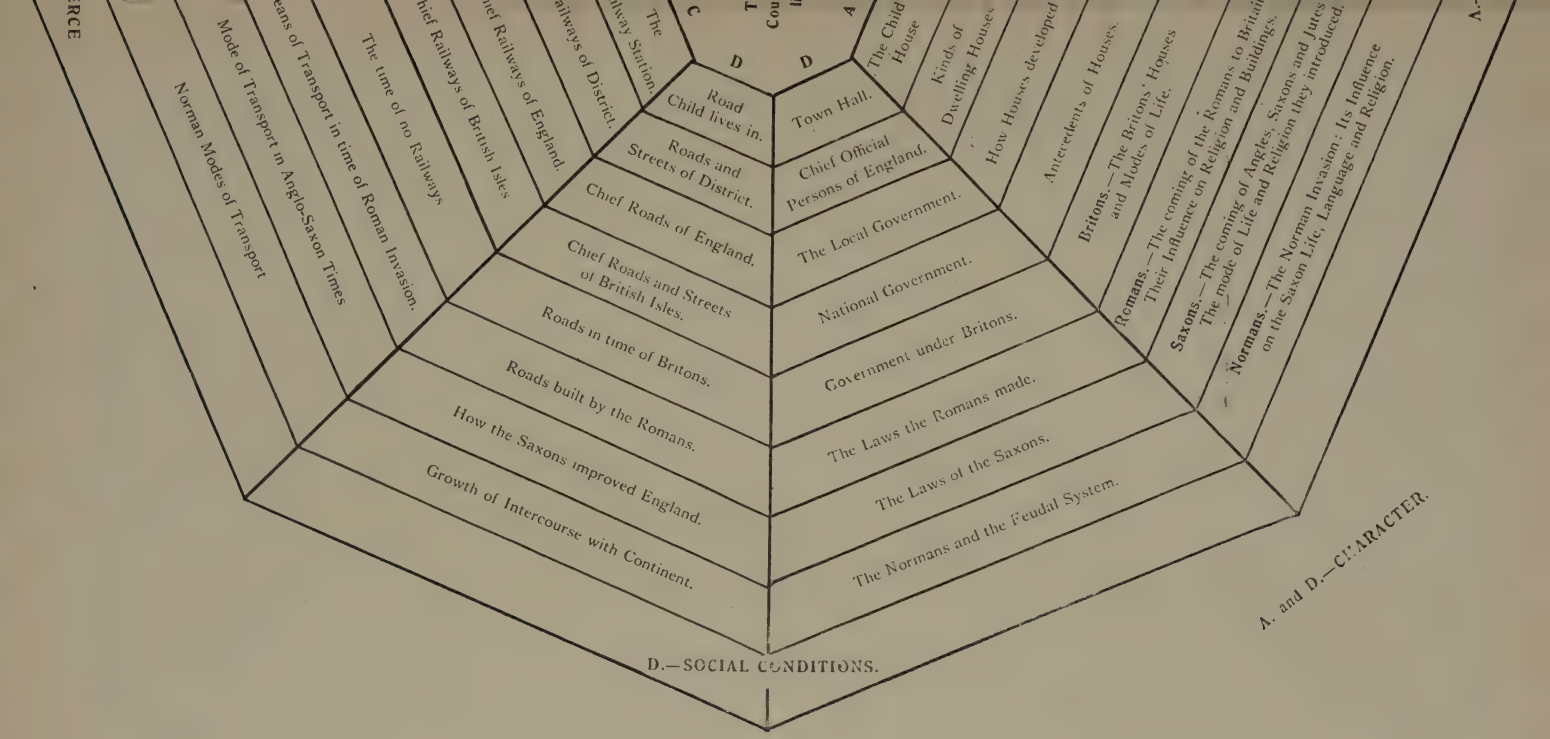
3—Commerce

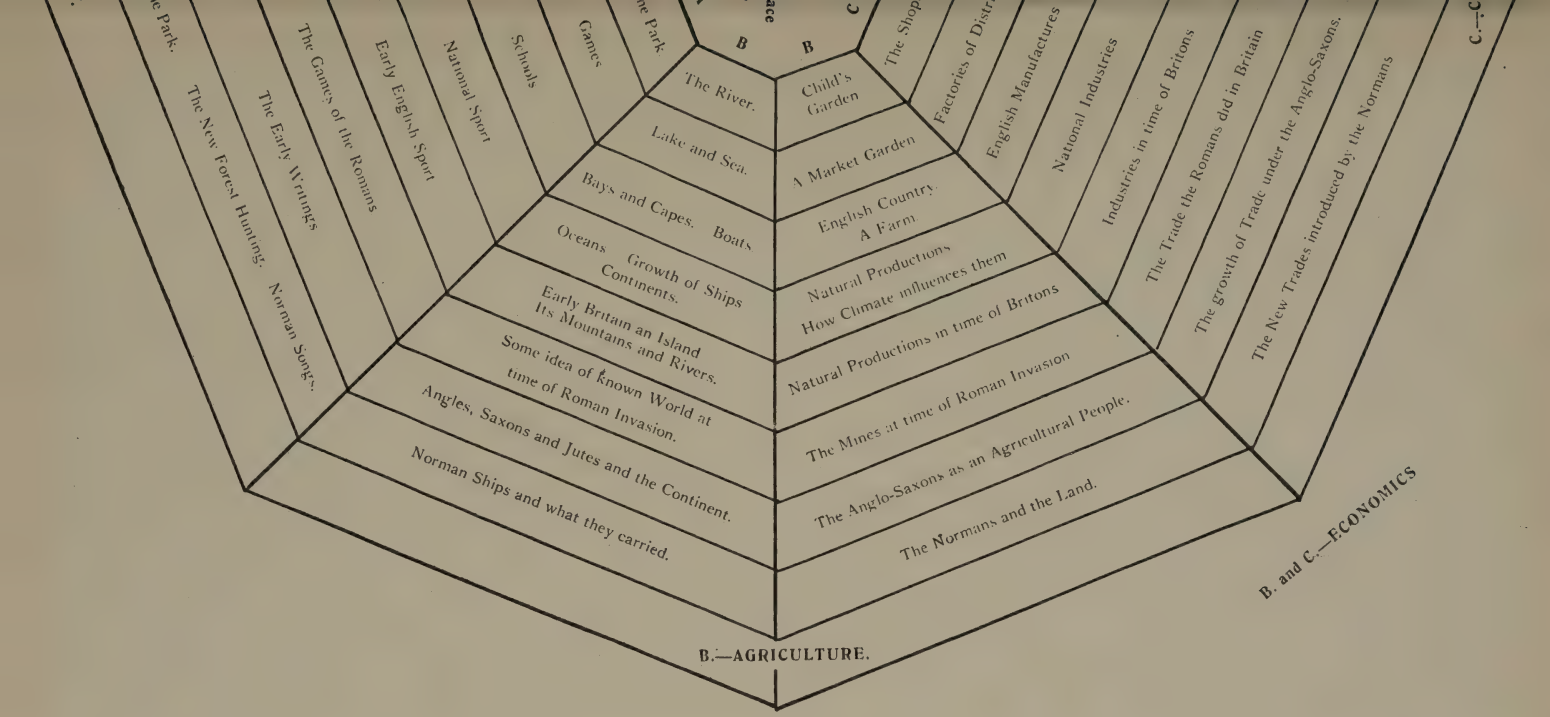
4—Social Conditions

and an understanding of these to a correct appreciation of the two great factors in life :—

1—Character

2—Economics


Norman Modes of Transport
Mode of Transport in Anglo-Saxon Times
Means of Transport in time of Roman Invasion.
The time of no Railways
Chief Railways of British Isles
Chief Railways of England.
Railways of District.
The Railway Station.
Growth of Intercourse with Continent.
How the Saxons improved England.
Roads built by the Romans.
Roads in time of Britons.
Chief Roads and Streets of British Isles.
Chief Roads of England.
Roads and Streets of District.
Road Child lives in.
Town Hall.
Chief Official Persons of England.
The Local Government.
National Government.
Government under Britons.
The Laws the Romans made.
The Laws of the Saxons.
The Normans and the Feudal System.
The Child's House
Kinds of Dwelling Houses
How Houses developed
Antecedents of Houses.
Britons.—The Britons' Houses and Modes of Life.
Romans.—The coming of the Romans: to Britain. Their Influence on Religion and Buildings.
Saxons.—The coming of Angles, Saxons and Jutes. The mode of Life and Religion they introduced.
Normans.—The Norman Invasion: Its Influence on the Saxon Life, Language and Religion.
D.—SOCIAL CONDITIONS.
A. and D.—CHARACTER.


B
B
C
The River.
Lake and Sea.
Bays and Capes. Boats.
Oceans Growth of Ships
Continents.
Early Britain an Island
Its Mountains and Rivers.
Some idea of known World at
time of Roman Invasion.
Angles, Saxons and Jutes and the Continent.
Norman Ships and what they carried.
Child's Garden
A Market Garden
English Country
A Farm
Natural Productions
How Climate influences them
Natural Productions in time of Britons
The Mines at time of Roman Invasion
The Anglo-Saxons as an Agricultural People.
The Normans and the Land.
Games
Schools
National Sport
Early English Sport
The Games of the Romans
The Early Writings
The New Forest Hunting. Norman Songs.
The Shop
Factories of Distri
English Manufactures
National Industries
Industries in time of Britons
The Trade the Romans did in Britain
The growth of Trade under the Anglo-Saxons.
The New Trades introduced by the Normans
B.—AGRICULTURE.
B. and C.—ECONOMICS

A Home-made Theodolite and Clinometer

By H. JOAD.

This exhibit, made by boys of 12 to 14 years, consists of a circular table marked in degrees and supported on a tripod.

Fitted into a hole in the centre of the table is a rod holding the sighting tube and circular disc, which has an indicating mark directly under the tube. Using a base line in playground or field, the 0 degrees mark on the circular table, the indicating mark on the disc and the sighting tube are all aligned along the base line: then by revolving tube and disc until a corner of field is sighted, the indicator on the disc shews through what angle the tube has revolved, i.e., it shews what angle a line to that corner of the field makes with the base line. The class notes this angle in sketch book and, after similarly sighting all corners from **both** ends of base line and noting angles, the class retires to class room and draws base line and the several lines to corners to scale. Where two lines, one from each end of base line, intersect, is the real position of a corner of the field, and thus fixing all corners they can be joined and a plan of the field to scale has been drawn. The class now finds area and in the next lesson goes out to check result with plane table, etc.

THE CLINOMETER

Underneath the sighting tube is fixed a semi-circular piece of wood marked in degrees and carrying a suspended plumb line. This disc can be revolved vertically as the tops of trees, buildings, etc., are sighted and, as the angle through which it is revolved is shewn by the plumb line, the heights of various objects can be ascertained.

A second series of lessons can very usefully be given in finding the latitude of the school with this apparatus and, finally, the exhibitor has used it very successfully in contouring a mound in a field which has first been surveyed by the aid of the theodolite.

Another exhibit has been very useful in teaching young children the idea of the seasons.

The earth (a large ball) is mounted on a platform at the end of a long arm of wood. A long knitting needle pierces the ball and inclined to the platform at $23\frac{1}{2}^{\circ}$.

The arm is pivoted at the other end on an upright which supports the sun, and from the sun is carried a wire along the arm. This wire represents a ray from the sun. As the arm is revolved, carrying the earth on its yearly journey, by the aid of two pulleys the earth slowly revolves so that the N. Pole of the knitting needle continues to point to the north throughout its annual journey.

The children readily see that the sun's ray (wire) points directly for six months south of the Equator and, for the other half of the journey, directly north of it. A red line shews the Equator on the ball while a white line represents the ecliptic.

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